UGL REGIONAL LINX

CIVIL TECHNICAL COMPETENCIES & ENGINEERING AUTHORITY

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CRN CM 001

LINKING COMMUNITIES. CONNECTING CUSTOMERS.

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Document Control

Function	Position	Name	Date
Approver	A&E Manager	Lucio Favotto	26.05.2022

Revision	Issue Date	Revision Description
1.6	10.11.2021	UGLRL Operational Standards Template applied
2.0	25.11.2021	First approved and issued UGLRL version
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5.0	26.05.2022	Appendix 9: UGLRL Intranet Links to Forms EA003
6.0	26.05.2022	Appendix 9: UGLRL Website Links to Forms EA003 included, intranet link removed

Summary of changes from previous version

Section	Summary of change
All	This document is based on the previous rail infrastructure maintainer (RIM). Full revision history is available on request from UGLRL

Working towards national competencies and roles

The Country Regional Network (CRN) is currently reviewing its track and civil competency requirements with an intent to align with national competencies and roles. This will allow roles to be transferrable between rail organisations. While the review is being undertaken, this manual provides the current minimum competency requirements to work on CRN civil infrastructure but will recognise the national roles provided they contain the minimum competency requirements of this manual.

National competency details can be located on the Rail Industry Worker website and within the latest version of The National Track and Civil Matrix.

Chapter 1 General

C1 Purpose

This manual provides requirements and guidelines for the management of maintenance and construction activities on the Country Regional Network (CRN) civil infrastructure.

It provides

1. Definition of titles and responsibilities as detailed in CRN standards
2. Engineering Authority for design, construction and maintenance activities
3. Competencies required to undertake construction and maintenance activities

C2 Context

The manual is part of CRN's engineering standards and procedures publications. More specifically, it is part of the Civil Engineering suite that comprises standards, installation and maintenance manuals and specifications.

Manuals contain requirements, process and guidelines for the management of civil assets and for carrying out examination, construction, installation and maintenance activities.

C3 How to read the Manual

The best way to find information in the manual is to look at the Table of Contents starting on page 3. Ask yourself what job you are doing? The Table of Contents is written to reflect the requirements being discussed.

Throughout this manual reference is made to the following levels of Engineering Authority:

- Principal Track and Civil Engineer
- Civil Maintenance Engineer
- Area Manager
- Superintendent
- Supervisor
- Leading Hand

These are general descriptors only. For an explanation of the positions in the CRN organisation that perform these functions, refer to Chapter 2.

C1-4 References

C1-4.1 Australian and International Standards

Nil

C1-4.2 CRN Documents

CRN CS 210 – Track Geometry and Stability

CRN CS 215 – Transit Space

CRN CM 203 – Track Inspection

CRN CM 211 – Track Geometry and Stability

CRN CM 215 – Transit Space

CRN CM 221 – Rail and Rail Joints

CRN CM 222 – Rail Welding

CRN CM 223 – Rail Adjustment

CRN CM 224 – Rail Defects and Testing

CRN CM 225 – Rail Grinding

CRN CM 231 – Sleepers and Fastenings

CRN CM 241 – Ballast

CRN CM 251 – Turnouts

CRN CM 301 – Structures General

CRN CM 302 – Structures Examination

CRN CM 303 – Structures Repair

CRN CM 305 – Structures Assessment

CRN CM 306 – Underbridges – Load Rating

CRN CM 311 –Transoms

CRN CM 421 – Track Drainage

CRN CM 511 – Boundary Fences

CRN CM 521 – Level Crossings

CRN CP 301 – Structures Construction

C1-4.3 TLI - Transport and Logistics Training Package

TLI - Transport and Logistics Training Package

Chapter 2 Definition of titles and responsibilities

This chapter explains the generic titles that have been used throughout the CRN Engineering Manuals and gives guidance for the mapping of the generic titles to position titles in the current CRN organisation.

It also provides definition of the division of technical responsibilities between the roles of Civil Maintenance Engineer and the Area Manager.

This has been provided to give guidance to field staff in establishing accountabilities. It must be noted that these responsibilities are only part of the full responsibilities of such positions and reference needs to be made to other documents (Position Descriptions etc.).

C2-1 Titles

Table 1: Generic Titles used in CRN Civil Engineering Standards and Manuals

Term	Definition	Mapping to CRN organisation
Principal Track and Civil Engineer	The technical head of the civil discipline in UGLRL CRN. The person in this position has been delegated Engineering authority by the CEO of UGLRL CRN to make engineering decisions relating to the integrity of civil assets	Principal Track and Civil Engineer
Infrastructure Maintenance Manager	Management in the line above the Civil Maintenance Engineer.	
Civil Maintenance Engineer	Engineering Manager on the CRN with relevant technical competency in the track & structures discipline. If the person in this position does not possess relevant civil competence, others with the competence shall be nominated to discharge technical accountability.	Civil Maintenance Engineer
Area Manager	Engineering Manager on the CRN responsible for management of routine maintenance. Technical responsibilities are based on a person with minimal technical competencies in railway civil engineering	Area Manager
Project Engineer	Engineer with responsibility for a defined project. Technical requirements assigned to project engineers in this manual may only be undertaken by persons competent in the tasks necessary to meet those requirements	Project Manager, Construction Manager, Project Engineer, Project Manager, Surveyor, Geotechnical Engineer
Superintendent	Manager of Track & Civil or Structures or Facilities discipline personnel in an Area. If people in these positions do not possess relevant civil competence, others with the competence shall be nominated to discharge technical accountability.	
Leading Hand	Leader of a maintenance or project team.	Supervisor, Facilities Officer
Track Patrol staff	Persons appointed or nominated to perform track patrol tasks.	

Term	Definition	Mapping to CRN organisation
Bridge Examiner	Person with Engineering Authority to examine and report on condition of bridges and other civil structures. This is normally the person conducting cyclic examinations but may also be specialist personnel.	
Routine Maintenance teams	Teams who undertake routine track maintenance activities.	
Site Leading Hand	Someone in direct control of a worksite.	
Production team	Teams undertaking major renewals activities such Resurfacing, resleepering, rerailing.	

Chapter 3 Working on CRN infrastructure

C3-1 Introduction

The Principal Track and Civil Engineer is accountable for the standards and processes that govern the integrity of defined elements of CRN infrastructure. This includes not only the physical condition of the infrastructure but also the integrity of the design, installation and maintenance activities that affect, or potentially affect, its continuing integrity.

To ensure the physical condition of infrastructure the Principal Track and Civil Engineer has jurisdiction over the civil infrastructure asset.

Similarly, to ensure integrity of the design, installation and maintenance processes it is necessary to have competent people working to standards that meet safety and reliability requirements.

The Principal Track and Civil Engineer must be satisfied that persons designing or working on railway civil infrastructure are competent to do the work and understand the standards and processes that have been adopted for use in CRN. This is achieved by the process of competency assessment and licensing described below.

In addition the Principal Track and Civil Engineer must be satisfied that persons who are responsible for design, maintenance and construction decisions have the appropriate collection of knowledge and skills to make the required decisions. To meet this need, UGLRL CRN has introduced a requirement for Engineering Authority. This process is described below.

This policy applies to all personnel employed or contracted by UGLRL CRN to undertake design, construction and maintenance work on rail infrastructure.

C3-2 Competency and licensing

All persons undertaking civil infrastructure design, installation and maintenance activities on the CRN network shall:

1. have appropriate competencies, and
2. be able to adopt and fully comply with UGLRL CRN Engineering standards and manuals when carrying out work or other activities

To meet the requirements of (1) above workers need to have National competencies, or where no National competency exists, appropriate qualifications, skills and knowledge as determined by the Principal Track and Civil Engineer as meeting the requirements of UGLRL CRN.

To meet the requirements of (2) above workers who meet the requirements of (1) need to have a licence to apply the competencies on CRN. The licence is an acknowledgement by UGLRL CRN that the worker understands the requirements of UGLRL CRN Engineering standards and manuals and is capable of applying them when undertaking work on CRN infrastructure.

Whilst competencies are generally granted only once and do not need to be renewed (unless there is a significant change in the competency), a licence is only granted for a defined period and will need to be renewed. In this way UGLRL CRN can make sure that the understanding and application of CRN engineering standards and processes remains current.

Details of the competencies applying to track and structures construction and maintenance activities on CRN infrastructure, the process for acceptance of competencies, and the process for granting of licences are documented in Chapter 4.

C3-3 Engineering Authority

Engineering Authority is MORE than a collection of competencies.

It is acknowledgement by UGLRL CRN that the person

- has the appropriate collection of competencies (or skills and knowledge in the absence of defined competencies) for the engineering decisions they are required to make,

- has been granted a licence to apply the competencies (or skills and knowledge) on CRN infrastructure to make engineering decisions in accordance with the standards applicable on the CRN, and
- is performing a function in which there is a need to make the engineering decisions.

Engineering Authority is provided for:

- Track Maintenance and Construction
- Structures Maintenance/Construction
- Track, Structures, Geotechnical and Right of Way Design
- Railway Survey

Engineering Authority grants holders authority to perform activities and make certain decisions.

Detailed procedures and guidelines for issue of Engineering Authority are documented in Chapter 5.

Chapter 4 Competencies and licences

C4-1 Introduction

This chapter details:

- the competencies required to undertake track & civil, structures and facilities construction and maintenance activities on CRN infrastructure,
- the process for acceptance of competencies, and
- the process for granting of licences

In addition, in the absence of formal competencies, the chapter details the skills and knowledge required for persons seeking Engineering Authority for civil infrastructure design activities, or for construction and maintenance engineering decisions affecting CRN civil infrastructure.

Note: There are other competencies required by persons working on CRN that are not mentioned here. They include competencies for track protection, training and administrative tasks etc.

C4-2 Technical competency requirements for civil activities

UGLRL CRN uses National Competency standards for maintenance and construction activities on CRN civil infrastructure.

Each manual in the CRN Engineering Manual series specifies the competencies required to undertake civil maintenance and installation activities. All of the activities and their accompanying competencies are detailed in in Table 2 to Table 6 for Track, Resurfacing, Structures, Geotechnical and Right of Way activities. These are available in Appendix 1.

Table 2 to Table 6 are set out as follows:

To carry out this work	Ref Manual	You need these competencies		
Adjust rails (either long welded or continuously welded)	CRN CM 223	TLIB3102 - Adjust rail	AND	The following CORE competencies Apply track fundamentals Install and repair rail fastening systems Install Rail Measure and record track geometry
Maintain adjustment in CWR track for the repair of rail defects or broken rails, or for inserting closures	CRN CM 223	Adjust rail competencies	OR	TLIW3015 - Weld rail using aluminothermic welding process

Competency

TLI XXX – National Competency

Indicates you must have both sets of competencies

Work activity

Manual reference. Contains detail of the activities

Work activity with a collection of competencies

Indicates you can do the activity with either competency

Essential lower level competencies necessary for the activity

Where it has been considered necessary, a set of CORE competencies has been associated with an activity in addition to the primary competency. These have been included where the work is complex or highly skilled and it is considered that a wider knowledge and skills base is required for successful performance of the activity.

In addition to the listings in Table 2 to Table 6, it is necessary to provide a single interpretation of the National Competencies in order to ensure that common standards apply and that:

- Competencies reflect the activities undertaken on CRN civil infrastructure.

- Competency acquisition (off-job training and on-job skills development) reflect the requirements of the activities.
- Assessment tools reflect the competencies.

Table 7 details the information in Table 2 in reverse for Track competencies. That is, “If I have this competency, I can do these activities.

Similarly Table 8 to Table 11 details the information in Table 3 to Table 6 in reverse for Resurfacing, Structures, Geotechnical and Right of Way competencies.

Table 7 to Table 11 are available in Appendix 2 and are set out as follows:

If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIS2012 - Install and maintain rail lubrication equipment	Install and remove rail lubricators 1. Maintain lubricators cleaning and adjustment replacing components adding lubricant checking operation 2. Check Rail Lubricators prior to operation of rail flaw detection vehicles	Plan and organise work requirements Select and use required tools, equipment and materials Install lubrication equipment Fit and operate rail lubrication equipment Check and service rail lubrication equipment Complete relevant documentation	You CAN'T Install or maintain Wheel Squeal applicators	To Install or repair Wheel Squeal Applicators you also need additional training in installing and maintaining Wheel Squeal applicators

Competency

List of all activities you can undertake with the competency

Evidence requirements

Related Activities you CANNOT undertake

C4-3 Competency acceptance process

Acceptance of competencies is on the following basis:

1. If it is a current National Competency that has been granted by a Registered Training Organisation (RTO) then UGLRL CRN will recognise the competency.
2. If it is a competency that was previously part of the suite of National competencies and has been replaced by new or altered competencies as detailed in this document then it will be dealt with in accordance with Section C4-5.
3. If it is a competency granted by RIC (i.e. with a RIC prefix) then it will also be dealt with in accordance with Section C4-5.
4. The following old qualifications (issued prior to 2004) are not valid and retraining is mandatory: PW2, PW3, PW4, PW5, PW5A, PW6, PW13, PW17, PW18, PW52/53, W1, W2.
5. All other competencies may only be recognised with the approval of the Principal Track and Civil Engineer.

C4-4 Granting a licence

Work may only be undertaken on CRN civil infrastructure by persons holding a licence for the activity they are performing.

Granting of a licence for a particular competency to an individual is formal recognition by UGLRL CRN that the person has demonstrated an appropriate level of understanding of UGLRL CRN engineering standards and processes applicable to the competency, and has a demonstrated ability to put them into practice.

A licence is valid for a period of 3 years and must be assessed prior to re-issue.

C4-4.1 First issue of licence

When a candidate has been granted a National competency for the first time by a UGLRL CRN authorised RTO a licence can be issued automatically for this competency.

C4-4.2 Review and re-issue of licence

Each management level in UGLRL CRN is accountable for continuing assessment of the performance of personnel and contractors under their control and for the arrangement of corrective action/refresher etc. They may request formal review of a licence at any time if the performance of an individual brings into question their ability to carry out the competencies allocated.

Formal re-issue of a licence is based on evidence of satisfactory performance of the activities associated with the licence and the fulfilment of any conditions. Conditions include:

1. For UGLRL CRN Staff, completion by the candidate's supervisor of a satisfactory Supervisor's Report. The Supervisor's Report shall include certification that the candidate;

- has regularly used the competency, and
- the performance of the competency has been satisfactory, and/or
- a review of a log book (where applicable) demonstrating performance of activities associated with the competency

2. Satisfactory completion of an On-the Job assessment by a competent workplace assessor in the 6 months prior to the re-issue date.

3. Undertaking a current CRN Standards briefing which may cover topics such as the correct application and use of civil standards, any significant changes between briefings and any proposed upcoming changed and findings as a result of incorrect application of the standards.

A listing of licence assessment requirements for the activities detailed in this manual is included as Table 22 in Appendix 6.

C4-4.3 Licencing of Contractors

Contractors are required to be licenced prior to commencing work on CRN civil infrastructure. To become licenced contractors shall have;

- the required competencies for the role, assessed and recertified at least at the frequencies listed in Appendix 6 Table 22 under 'Licence Period'.
- a current CRN Civil Standards Briefing at the frequency listed in Appendix 6 Table 22.
- a Supervisors Report or other equivalent process accepted by UGLRL CRN or evidence demonstrating competence as provided in paragraph below.
- all licencing related records maintained within an online competency management system.

Contractors must be able to demonstrate a candidates competency based on current evidence of satisfactory performance of the activities undertaken. Examples of demonstrated evidence may be in the form of but not limited to;

- a Supervisors Report completed by either the candidates supervisor or a UGLRL CRN supervisor where the candidate has been previously engaged.
- the contractor demonstrating a suitable alternative process within their management system

- the candidates current resume or CV
- a log book demonstrating performance of activities associated with the competency
- copies of inspection and test plans or records for activities associated with the competency
- past work history for UGLRL CRN

UGLRL CRN supervisor's must assure themselves of contractor suitability at the time of tender or engagement. This is subject to the complexity of the work being undertaken and the level of UGLRL Supervision provided.

C4-4.4 Personnel in training

Personnel in training may only undertake activities that require licences under the direct supervision of a person who holds the relevant licence. In these circumstances the person with licence remains accountable for the satisfactory performance of the activity.

C4-5 Treatment of old competencies

The CRN Civil Engineering Manuals refer to technical competencies by the numbering system used by the Transport & Logistics Industry Skills Council in the Competency Standards contained in the TLI - Transport and Logistics Training Package.

Since the latest TLISC Competency Standards have only been published for a short time, some civil infrastructure workers may have been trained to and awarded competencies based on earlier packages. These were, principally, the

- Transport & Distribution Training Council (competencies with TDT prefix), or the
- Transport & Logistics Industry Skills Council (TLISC) 2007 or 2010 Competency Standards

Whilst there were no technical content changes from the TDT competency set to Version 1 of the TLI 2007 competency set first published in September, 2007, significant changes were made in TLI 2007 Version 3, published in December, 2009. These changes were reflected in TLI 2010 (TLI10) Version 1 with changes to the competency codes. Further changes were published from version 2 in February 2012 through to version 4.2 in March 2014.

The latest TLI - Transport and Logistics Training Package was published in October, 2015 commencing as TLI Release 1.0. (Note: The reversion in package numbering is a consequence of the introduction of New Standards for Training Packages by the Standing Council on Tertiary Education, Skills and Employment.)

This means that the competency or competencies required for some work activities has changed. Where persons have competencies that have changed, in most cases they will be able to undertake the tasks associated with the new competencies.

In many cases the changes in technical content from the 2007 TLI to 2010 TLI competencies brought the TLI competencies into line with industry interpretation of the TDT competencies, against which the off job training and on-job competency assessment has been conducted. This means that there is a direct transfer from the TDT competency to the 2010 TLI competency.

Chapter 5 Engineering Authority

C5-1 Introduction

This chapter provides procedures and guidelines for issue of Engineering Authority to personnel who are required to make engineering decisions that impact on civil infrastructure in the Country Regional Network (CRN).

C5-2 Principles

1. The Principal Track and Civil Engineer controls the Engineering Authority process and granting of EA in the Track and Civil discipline. They may delegate granting of Engineering Authority to nominated persons.
2. Engineering Authority is valid for a maximum of 3 years and must be assessed prior to re-issue.
3. Whilst granting of EA can only be undertaken by the Principal Track and Civil Engineer (or delegates) each management level in UGLRL CRN is accountable for continuing assessment of the performance of personnel and contractors under their control and for the arrangement of corrective action/refresher etc. They may request formal assessment for EA continuance at any time.
4. Engineering authority will apply to all management levels. Where there are no identifiable technical competencies at a management level then the holder of the management position may be granted the same Engineering Authority as the management level below.

   e.g. The Area Manager may not have Engineering Authority. The EA responsibilities for Civil Maintenance Engineer will flow from the CME up to the Principal Track and Civil Engineer. Alternatively the Area Manager may be granted Engineering Authority at CME level.
5. UGLRL CRN MUST identify and grant Engineering Authority in each EA level otherwise prescribed engineering decisions cannot be made. These decisions are detailed in the engineering manuals and are summarised in the “You can do” column of Table 15 and Table 16. (See Appendix 4).

   e.g. The Superintendent at Xyz does not have EA Level 2 for Structures Maintenance/construction. The Structures Leading Hand (EA Level 1) under his control must seek EA Level 2 decisions from the Superintendent at Abc who has EA Level 2.
6. Where persons do not have sufficient knowledge or skills to be granted full engineering authority for a level “Conditional” or “Partial” Engineering authority may be granted and the missing parts of the EA passed to another person.
7. Personnel in training may only undertake activities that require Engineering Authority under the direct supervision of a person who holds the relevant Engineering Authority. In these circumstances the person with EA remains accountable for the satisfactory performance of the activity.
8. Personnel may request granting or review of Engineering Authority when new competencies and/or associated licences have been gained.
9. A comprehensive listing of EA in UGLRL CRN must be established and published.
10. EA needs to be granted to cover absences of personnel on leave, illness etc.

C5-3 Engineering Authority Levels

In the same way that there are different levels of management in UGLRL CRN, each succeeding level having a higher level of authority for management decisions, there are different levels of Engineering Authority necessary for progressively more difficult or complex technical decisions.

The levels of Engineering Authority in UGLRL CRN are:

Maintenance and construction

- Level 1 – Leading Hand
- Level 2 – Leading Hand
- Level 3 – Superintendent / Maintenance Engineer / Project Engineer
- Level 4 – Civil Maintenance Engineer / Area Manager / CRN Rail Engineer / CRN Structures Engineer
- Level 5 – Principal Track and Civil Engineer

Design

- Level 4 – Designer
- Level 5 – Principal Track and Civil Engineer

The titles shown are nominal only. Engineering Authority may be granted to other personnel.

C5-4 Engineering authority for maintenance and construction

Each level of Engineering Authority requires demonstration of a collection of competencies necessary to ensure successful performance. The core competencies for each EA level in track maintenance/construction are detailed in Table 12 and for structures maintenance/construction in Table 13. (See Appendix 3)

The competencies listed for EA level 1 are National Competencies from the TLI - Transport and Logistics Training Package.

The competencies listed for EA levels 2 – 5 are nominated in Table 12 and Table 13. The headings and associated knowledge and skills are explained in Table 15 and Table 16 (see Appendix 4). These are used to determine suitability for granting of EA.

EA Level 1 may be automatically granted to staff who hold the required national competencies for the role being undertaken and provided the competencies are maintained and current.

EA Level 2 may be automatically granted to staff who hold the required national competencies for EA Level 1 and have been directly appointed to the role.

C5-4.1 Assigning Engineering Authority

The issue of Engineering Authority to a candidate who has been granted a licence for the relevant competencies in the specified Engineering Authority Level is the final step in the process.

The capability of the person applying for Engineering Authority shall be assessed using evidence of previous work rail specific work undertaken, review of CV including qualifications, training, experience, complexity of previous projects delivered, referees reports and/or by interview.

The level of Engineering Authority that a position may apply for is provided in Table 12 and Table 13, with details of competencies relevant to activities able to be undertaken are provided in Table 15 and Table 16 (See Appendix 3 and Appendix 4 respectively).

The prospective person requesting Engineering Authority is to complete self assessment form located in Appendix 9 along with any supporting documentation as detailed above and provide to the Principal Track and Civil Engineer for acceptance.

If the Engineering Authority of the individual lapses or the individual moves to another position not requiring the Engineering Authority, then the individual shall no longer exercise this authority. For contractors the completion of an engagement, for which a specific EA has been granted, equates to movement to another position.

C5-4.2 Contractors

If a contractor is engaged in a role requiring Engineering Authority, Engineering Authority will be sought. If the contractor already has EA from UGLRL CRN, the Principal Track and Civil Engineer will assess the conditions of the EA to establish if the EA is applicable to the new engagement. If not, then the full process needs to be completed.

If a contract ends but a person is engaged on a new contract which has similar EA requirements, the EA may continue unless conditions placed on the original granting of Engineering Authority indicate otherwise.

C5-4.3 Review and re- issue of Engineering Authority

Whilst issuing of Engineering Authority can only be undertaken by the Principal Track and Civil Engineer (or delegates) each management level in UGLRL CRN is accountable for continuing assessment of the performance of personnel and contractors under their control and for the arrangement of corrective action/refresher etc. They may request review of Engineering Authority at any time if the performance of an individual brings into question their ability to carry out the competencies allocated.

Re-issue of Engineering Authority is based on evidence of satisfactory performance of the activities associated with the type and level of Engineering Authority and the fulfilment of any conditions. Conditions include:

1. Completion by the candidate's supervisor of a satisfactory Supervisor's Report
2. Evidence of currency of licences for the competencies in the relevant EA set

C5-5 Engineering Authority for design and survey

The Engineering Authority requirements for design and survey differ from the requirements for maintenance and construction.

Prior to commencing any design activities, confirmation that all design team members have the appropriate level of Engineering Authority to undertake specific aspects of the design should be completed.

C5-5.1 Exercising engineering authority

Engineering design, investigation and survey activities for CRN civil infrastructure may only be undertaken by persons who have been granted Engineering Authority appropriate for the task.

Designers and surveyors need to have a clear understanding of the limits of their Authority and competence and must actively resist undertaking work for which they do not have the authority.

The design activities covered by this requirement are detailed in Table 18 for track design activities and in Table 19 for structures design activities. Likewise, geotechnical investigation and design activities are detailed Table 20 and survey activities are detailed in Table 21 (See Appendix 5).

C5-5.2 Allocating engineering authority

The allocation of Engineering Authority for design requires that:

- The person is competent to undertake the particular design activity
- The person is in a position that requires this Authority to carry out the design tasks

Engineering Authority for each person is assigned by the Principal Track and Civil Engineer. The Principal Track and Civil Engineer will only issue EA in circumstances where the above requirements are met.

C5-5.3 Review and re-issue of engineering authority

Review and re-issue of Engineering Authority can occur at any time. Reasons for review are:-

- Request by designer

- Duration of the EA is about to expire
- Designer has gained experience / skills etc. and wishes to have them recognised
- Performance of an individual brings into question their ability to carry out the competencies allocated
- The assessment will be conducted Principal Track and Civil Engineer

C5-5.4 Authority levels

In accordance with the requirements detailed in Section C5-3, Engineering Authority for design is allocated at EA Level 4 only. To allow for persons in training, this level has been further split into two categories. Designers may be granted EA in either the following categories:

Category A This level is for experienced designers who are able to perform complex activities independently and without supervision. They are capable of assessing risk and solving problems for designs that are of a more complex nature. A high degree of analytical skill is required working from a clear and broad understanding of the underlying principles that are being complied with.

Category B This level is for designers who are competent to carry out work where the configuration is of a standard nature and the standard procedures can be followed without confusion or uncertainty caused by complexity. It is also applied to team members operating on Category A tasks under the supervision of a person with Category A Authority.

C5-5.5 Assigning Design Engineering Authority

The capability of the designer will be assessed by reviewing evidence of previous rail specific work undertaken, review of CV including qualifications, training, experience, complexity of previous projects delivered, referees reports and/or by interview.

The range of competencies relevant to activities undertaken in Track Design is listed in Table 18 and for Structures design in Table 19. Likewise, geotechnical investigation and design activities are detailed in Table 20 and survey activities are detailed in Table 21 (See Appendix 5).

The prospective Designer requesting Engineering Authority is to complete self assessment form located in Appendix 10 and provide this assessment along with any supporting documentation as detailed above to the Principal Track and Civil Engineer for acceptance.

Chapter 6 Training and Assessment Policy

C6-1 Authority to train and assess

Training and assessment in the technical competencies detailed in this manual shall only be undertaken by Registered Training Organisations (RTOs) who have been authorised by the Principal Track and Civil Engineer in conjunction with the Learning and Development Manager. Such organisations will be designated as Authorised Training Organisations (ATOs). The Principal Track and Civil Engineer's requirements for authorisation are detailed in Section C6-6.

C6-2 Authority to assess for licence

Assessment for purposes of granting or re-issuing of a licence shall only be undertaken by persons meeting the criteria detailed in Section C6-6.3.

C6-3 Competency standards

UGLRL CRN is committed to the use of National Competency Standards. The units of competency are listed in the UGLRL Pty Ltd NSW Competency Profiles and are, for the most part, national units of competency. In cases where no appropriate national unit of competency exists, or where the national unit of competency does not adequately reflect the skills required in UGLRL CRN, specific UGLRL CRN competencies are developed.

The Principal Track and Civil Engineer authorises the use of specific National Competency Standards for UGLRL CRN activities, or where it is determined that National Competency standards do not adequately reflect the skill set required for an activity, they authorise a UGLRL CRN Competency Standard. In doing so the Principal Track and Civil Engineer must be satisfied that a person who has the specific competency will be able to do the work to the desired level of proficiency.

The match between activities and skills is documented in Table 2 to Table 6 of this manual.

C6-4 Skill development

The technical content of training materials is provided by the Principal Track and Civil Engineer through the publication of CRN Engineering Manuals. Additions or changes to the technical content of training material are authorised by the Principal Track and Civil Engineer.

The Principal Track and Civil Engineer also provides interpretation of relevant competency standards for use in development of training curricula and material. The interpretation is documented in Table 7 to Table 11 of this manual. No other interpretation is authorised.

C6-5 Review and improvement process

The Principal Track and Civil Engineer, as part of the Integrity Review process, undertakes reviews to test that the following objective continues to be met:

"The integrity of work on CRN civil infrastructure is ensured by people who have appropriate knowledge and skills for the installation and maintenance activities they undertake."

Reviews include:

- The match between skills required to undertake activities to meet CRN standards and the skill level of workers
- The match between the competency standards and the skill level that is required to carry out activities
- Choices of delivery method (on/off job decision process)
- Training Course content
- Training Delivery (competency of trainers)

- Assessment tools and methods

C6-6 Technical requirements for training and assessment

C6-6.1 Becoming an Authorised Training Organisation

Organisations engaged in the Off-job training and assessment and On-job assessment in the technical competencies relating to civil installation and maintenance activities on the CRN Network must be approved to do so by the Principal Track and Civil Engineer. They must:

- be a Registered Training Organisation (RTO) with Transport and Logistics (Rail) registration
- operate in accordance with the Australian Quality Training Standard for Registered Training Organisations.
- The training provider's scope of registration must include endorsed units of competency from one or more of the Transport and Logistics Industry Skills Council (TLISC) Training Packages in:
- Rail Operations and/or
- Rail Infrastructure.

The RTO is responsible for:

- Ensuring that Curricula, training content, assessment tools, delivery methods, trainer competency and assessor competency meet the requirements of this document to the satisfaction of the Principal Track and Civil Engineer.
- ensuring that the assessments are conducted in accordance with UGLRL CRN policies and standards
- ensuring that the training and assessment are conducted by a person who is technically competent at least to the level to which the training/assessment is being undertaken
- ensuring that the relevant performance criteria are used as the benchmark for competency assessment
- providing quality assurance mechanisms to ensure that the assessment is fair, reliable, valid and provides for a consistency of outcomes
- ensuring that assessments are conducted in a timely manner
- issuing a statement of competence (including the RTO national code) and recommending certification
- maintaining records of all assessments undertaken
- instituting a reporting process for assessment outcomes
- providing access to records in a secure and efficient manner

To grant Authorised Training Organisation status, the Principal Track and Civil Engineer shall assess (or have assessed):

- The organisation's curriculum for the courses relevant to UGLRL CRN activities. The assessment judges the match of competencies addressed in the curriculum with UGLRL CRN activities and the adequacy of training content
- The method and adequacy of training delivery. The assessment judges the appropriateness of the training duration, the mix between off and on job training and competency acquisition, and the competence of the training personnel
- The method of assessment and the adequacy of assessment tools and assessment personnel. The assessment judges the appropriateness of the assessment instruments to assure that

required competence has been achieved, and the ability of assessment personnel to make appropriate judgements regarding competence.

Authorised Training organisations will be issued with documentation by the Principal Track and Civil Engineer which details:

- the training courses for which they are authorised,
- the corresponding Civil Technical Competency/Competencies addressed by the courses, and
- any limitations or conditions attached to the authorization

C6-6.2 Who can train?

The RTO must ensure that the training is delivered by a person who:

- is technically competent to at least the standard of the training being conducted
- holds a minimum of the relevant Trainer units of competency from TAA04 as determined by UGLRL CRN, or
- is under direct supervision of a person with these competencies or
- is able to demonstrate equivalent competencies

Note: Direct supervision is achieved when a person delivering training on behalf of the RTO has regular guidance, support and direction from a person designated by the RTO who has the required competencies, and who monitors and is accountable for the training delivery. Australian Quality Training Framework, Standards for Registered Training Organisations ANTA 2001.

C6-6.3 Who can assess?

Assessment for purposes of granting or re-issue of a licence shall only be undertaken by persons or organisations authorised by the Principal Track and Civil Engineer in conjunction with the Training and Development Manager.

Authorised assessors may be UGLRL CRN employees or contractors, or be employed by RTOs who have been authorised to undertake assessments.

To be authorised a person must:

1. Possess current qualifications in the competency they are assessing

   Staff having extensive knowledge and experience in the competency, AND who are currently working in a field associated with the process e.g. training, mentoring, supervising/managing may be deemed to meet this requirement for the purposes of assessment ONLY.
2. Possess a minimum of 2 years practical experience in the competency
3. Understand the processes involved in the assessment procedure.
4. Hold Workplace Assessors competencies as nominated by the Training and Development Manager
5. Undertake assessments using assessment tools either approved by or provided by UGLRL CRN.

RTOs may be authorised to conduct assessments under the following circumstances:

1. They have defined procedures for assessment of the necessary competencies
2. They have assessment tools that meet UGLRL CRN's requirements to test the candidate's knowledge of and ability to apply UGLRL CRN's standards and procedures
3. Their assessment personnel meet the above requirements for authorised assessors.

RTOs that are granted Authorised Training Organisation status for training and assessment of competencies are also granted “authority to assess” for issue and re-issue of licences. When this occurs the Authorised Training Organisation is able to issue licences at the same time as successful completion by a candidate of the requirements for granting of competencies.

C6-6.4 Training Standards

C6-6.4.1 Installation and maintenance activities

Training and assessment resources have been developed for the following railway civil installation and maintenance activities.

Required learning outcomes are documented for each of these activities.

A detailed description of the tasks that might be performed in each of the work activities is listed in Table 7 to Table 11 of this manual.

C6-6.4.2 Performance criteria

Performance criteria are documented for each competency in Table 7 to Table 11 in the column "You need to show that you can". These criteria describe the required learning outcomes for each competency.

C6-6.4.3 Content

The principal content of training for each competency is detailed in the CRN Engineering Manuals. Table 2 to Table 6 of this manual detail the manual relevant to each activity and the associated competency/competencies.

Relevant content from each manual can be identified by referring to the activities and performance criteria nominated for each competency.

C6-6.4.4 Variables

The Country Regional Network is geographically diverse and the range of infrastructure types is also diverse. It is probable that most, if not all, persons working on CRN's civil infrastructure will work on the full range of infrastructure. Accordingly, training shall be provided for all infrastructure types and processes. Specific exceptions to this are detailed in Table 7 to Table 11. In these cases, additional training will be required for anyone working on the specified special infrastructure. For example, skills for use of a Robotic Welder are not routinely taught in "Wire feed welding ". Additional training is provided to wire feed welder in locations where there use is required.

C6-6.4.5 Training methodology

Training resources must be designed to facilitate the achievement of competence in the workplace.

To this end it is desirable to relate the information in the CRN Engineering Manuals as closely as possible to the activities performed in the learner's workplace.

Explanations, examples and language used should be referenced to workplace scenarios. Training on the job should be provided, where possible.

Appendix 1 Technical competency requirements for track & structures activities

Table 2 Technical Competency Requirements for Track Activities				
To carry out this work	Ref Manual	You need these competencies		
Measuring track	CRN CM 203	TLIB2085 - Apply track fundamentals		
Track Patrol Walking patrol Hi-rail patrol Wet Weather patrol Heat patrol Front of train examination	CRN CM 203	TLIB3100 - Visually inspect track infrastructure	**AND**	The following CORE competencies TLIB2085 - Apply track fundamentalsTLIS2030 - Carry out track ballasting TLIS2031 - Install railway sleepers TLIS2034 - Install and repair rail fastening systems TLIS2044 - Carry out rail installation TLIB2091 - Measure and record track geometry
Track Examination	CRN CM 203	Track Patrol competencies	**AND**	TLIB3099 - Examine track infrastructure
Certify plain track after track examination	CRN CM 203	Track Examination Competencies	**AND**	TLIB3094 - Check and repair track geometry
Turnout & special trackwork Examination (EXCEPT “Vulnerable turnouts”)	CRN CM 203	Track Examination Competencies		
Certify Turnout & special trackwork after track examination (EXCEPT “Vulnerable turnouts”)	CRN CM 203	Certify plain track after track examination Competencies		
Examine “vulnerable” turnouts & special trackwork	CRN CM 203	Track Examination Competencies	**AND**	TLIB3095 - Check and repair points and crossings
Certify “vulnerable” turnouts & special trackwork after track examination	CRN CM 203	Certify plain track after track examination Competencies	**AND**	TLIB3095 - Check and repair points and crossings
Undertake track geometry recording examination with measurement trolley	CRN CM 203	Track Examination Competencies	**AND**	Trained in use of the measurement trolley
Post Irregularity examination	CRN CM 203	Track Examination Competencies	**AND**	TLIB3094 - Check and repair track geometry
Check Rail Lubricators prior to operation of rail flaw detection vehicles	CRN CM 203	TLIS2012 - Install and service rail lubrication equipment	**AND**	TLIB2085 - Apply track fundamentals

Table 2 Technical Competency Requirements for Track Activities				
To carry out this work	Ref Manual	You need these competencies		
Service Rail Lubricators	CRN CM 203	TLIS2012 - Install and service rail lubrication equipment	**AND**	TLIB2085 - Apply track fundamentals
Lift and line plain track and restore plain track alignment (Manual Methods)	CRN CM 211	TLIB3094 - Check and repair track geometry	**AND**	TLIB2085 - Apply track fundamentals
Restore track geometry	CRN CM 211	TLIB3094 - Check and repair track geometry	**AND**	TLIB2085 - Apply track fundamentals
Measure Track Geometry	CRN CM 211	TLIB2091 - Measure and record track geometry	**AND**	TLIB2085 - Apply track fundamentals
Make changes to track geometry affecting clearances, station platforms or track adjustment	CRN CM 211	TLIB3094 - Check and repair track geometry	**AND**	TLIB2085 - Apply track fundamentals
Maintain track at Train Inspection Sites	CRN CM 211	TLIB3094 - Check and repair track geometry	**AND**	TLIB2085 - Apply track fundamentals
Undertake Defensive Measures for Summer Track Stability – Centre line marking of curves, Applying Heat Speeds	CRN CM 211	TLIB3094 - Check and repair track geometry	**AND**	TLIB2085 - Apply track fundamentals
Special Inspection/ Monitoring of Sharp Curves prior to Summer	CRN CM 211	Track Patrol competencies		
Analyse Track Stability using manual analysis techniques	CRN CM 211	TLIB3099 - Examine track infrastructure	**AND**	TLIB2085 - Apply track fundamentals
Control adjustment to prevent misalignments	CRN CM 211	Adjust rail competencies		
Check adjustment at misalignments	CRN CM 211	Adjust rail competencies		
Repair misalignments (except track adjustment component)	CRN CM 211	TLIB3094 - Check and repair track geometry	**AND**	TLIB2085 - Apply track fundamentals
Install Permanent Speed Signs	CRN CM 211	TLIB3094 - Check and repair track geometry	**AND**	TLIB2085 - Apply track fundamentals
Impose and remove Temporary Speeds	CRN CM 211	TLIB3094 - Check and repair track geometry	**AND**	TLIB2085 - Apply track fundamentals

Table 2 Technical Competency Requirements for Track Activities				
To carry out this work	Ref Manual	You need these competencies		
Investigate siding derailments or Low level mainline derailments where track IS NOT involved in cause	CRN CM 213	TLIB3099 - Examine track infrastructure	**AND**	TLIB2085 - Apply track fundamentals
Investigate Low level mainline derailments where track IS involved in cause or moderate level mainline derailments where track IS NOT involved in cause	CRN CM 213	Investigating and Managing Track Irregularities (see Table 15)		
Investigate moderate level mainline derailments where track IS involved in cause or high level mainline derailments	CRN CM 213	Nominated by Principal Track and Civil Engineer		
Install rail joints	CRN CM 221	TLIB2121 - Maintain rail joints **OR** TLIS2044 - Carry out rail installation	**AND**	TLIB2085 - Apply track fundamentals
Repair rail joints	CRN CM 221	TLIB2121 - Maintain rail joints	**AND**	TLIB2085 - Apply track fundamentals
Cut rail using Oxy/LPG acetylene (DOES not include trimming rail ends prior to welding)	CRN CM 221	TLIW3035 - Heat and cut materials using oxy-LPG equipment for the rail industry	**OR**	TLIW3015 - Weld rail using aluminothermic welding process
Crow rail ends	CRN CM 221	TLIB2121 - Maintain rail joints **OR** TLIS2044 - Carry out rail installation	**AND**	TLIB2085 - Apply track fundamentals
Undertake grinding of rail surface defects	CRN CM 221	TLIW2012 - Grind rails **OR** TLIW3015 - Weld rail using aluminothermic welding process	**AND**	TLIB2085 - Apply track fundamentals
Install or remove rail or rail closures	CRN CM 221	TLIS2044 - Carry out rail installation	**AND**	TLIB2085 - Apply track fundamentals
Certify plain track during or after rerailing	CRN CM 221	TLIS2044 - Carry out rail installation	**AND** **AND**	TLIB3094 - Check and repair track geometry TLIB2085 - Apply track fundamentals
Use rail bonds	CRN CM 221	TLIS2044 - Carry out rail installation	**AND**	Trained and assessed as competent by a Signal Engineer

Table 2 Technical Competency Requirements for Track Activities				
To carry out this work	Ref Manual	You need these competencies		
Install or remove rail anchors	CRN CM 221	TLIB2121 - Maintain rail joints **OR** TLIS2034 - Install and repair rail fastening systems	**AND**	TLIB2085 - Apply track fundamentals
Install or repair rail lubricators	CRN CM 221	TLIS1209 - Install and service rail lubrication equipment	**AND**	TLIB2085 - Apply track fundamentals
Straighten dipped welds	CRN CM 221	TLIB3094 - Check and repair track geometry	**AND** **AND**	Trained in use of Weld straightener TLIB2085 - Apply track fundamentals
Aluminothermic welding	CRN CM 222	TLIW3015 - Weld rail using aluminothermic welding process	**AND**	The following CORE competencies TLIB2085 - Apply track fundamentals TLIS2034 - Install and repair rail fastening systems TLIS2044 - Carry out rail installation TLIW3035 – Heat and cut materials using oxy-LPG equipment
Grind welds after installation	CRN CM 222	TLIW2012 - Grind rails **OR** TLIW3015 - Weld rail using aluminothermic welding process	**AND**	TLIB2085 - Apply track fundamentals
Certify aluminothermic welds during or after welding	CRN CM 222	Aluminothermic welding competencies		
Wire feed welding	CRN CM 222	TLIW0036 - Apply electric welding process to rail	**AND**	The following CORE competencies TLIB2085 - Apply track fundamentals TLIS2034 - Install and repair rail fastening systems TLIW3035 – Heat and cut materials using oxy-LPG equipment
Wire feed welding of manganese crossings	CRN CM 222	Wire feed welding competencies	**AND**	Where applicable additional training in the use of the "Robotic Welder"
Grind crossings after wirefeed welding	CRN CM 222	TLIW3013 - Grind switches and crossings	**AND**	TLIB2085 - Apply track fundamentals
Certify wirefeed welds during or after welding	CRN CM 222	Wire feed welding competencies		

Table 2 Technical Competency Requirements for Track Activities				
To carry out this work	Ref Manual	You need these competencies		
Certify plain track during or after welding has been done (sleepers restored, fastenings, geometry etc.)	CRN CM 222	Certify plain track after track examination Competencies		
Certify turnouts and special trackwork during or after welding has been done (sleepers restored, fastenings, geometry etc.)	CRN CM 222	Certify plain track during or after welding competencies		
Inspect and test oxygen /LPG or acetylene equipment.	CRN CM 222	Authorised CRN personnel (See CRN CM 222).		
Adjust rails (continuously welded, long welded or loose rail)	CRN CM 223	TLIB3102 - Adjust rail	**AND**	The following CORE competencies TLIB2085 - Apply track fundamentals TLIS2034 - Install and repair rail fastening systems TLIS2044 - Carry out rail installation TLIB2091 - Measure and record track geometry
Maintain adjustment in CWR track for the repair of rail defects or broken rails, or for inserting closures	CRN CM 223	Adjust rail competencies	**OR**	Aluminothermic welding competencies
Certify that rail adjustment has been undertaken correctly	CRN CM 223	Adjust rail competencies		
Certify track during or after rail adjustment	CRN CM 223	Certify plain track after track examination Competencies	**AND**	Adjust rail competencies
Install Creep Pegs	CRN CM 223	TLIB3102 - Adjust rail	**AND**	TLIB2085 - Apply track fundamentals
Monitor Creep	CRN CM 223	Track Examination Competencies		
Ultrasonic examination of rail using hand held equipment	CRN CM 224	TLIS3010 - Test rail using ultrasonic equipment	**AND**	The following CORE competencies TLIB2085 - Apply track fundamentals

Table 2 Technical Competency Requirements for Track Activities							
To carry out this work	Ref Manual	You need these competencies					
Ultrasonic examination of field welds	CRN CM 224	Ultrasonic examination of rail competencies					
Alignment Testing of welds	CRN CM 224	Ultrasonic examination of rail competencies **OR** Aluminothermic welding competencies			**OR**	TLIB3094 - Check and repair track geometry AND TLIB2085 - Apply track fundamentals	
Visual examination and adjustment check (punch mark check)	CRN CM 224	Ultrasonic examination of rail competencies **OR** Adjust rail competencies			**OR** **OR**	Aluminothermic welding competencies OR Track Patrol competencies	
Ultrasonic testing of turnouts and special trackwork using hand held equipment	CRN CM 224	Ultrasonic examination of rail competencies			**AND**	TLIS3011 - Test rail using non-destructive testing equipment	
Test switch tips using dye penetrant	CRN CM 224	Ultrasonic examination of turnouts competencies					
Visual Assessment of Manganese & CV Crossings	CRN CM 224	Ultrasonic examination of turnouts competencies					
Assess VSH Rail Defects	CRN CM 224	Ultrasonic examination of rail using hand held equipment competencies			**OR**	Staff certified as competent in the use of the guidelines in CRN CM 224 by the CME	
Assess broken rails for continued traffic	CRN CM 224	Track Examination Competencies			**AND**	TLIB3094 - Check and repair track geometry	
Technical supervision of plain track and turnout grinding	CRN CM 225	CRN Grinding Supervisor					
Assess rail conditions and determine remedial grinding measures	CRN CM 225	CRN Rail Engineer					
Remove and install sleepers	CRN CM 231	TLIS2031 - Install railway sleepers	**AND**	TLIS2034 - Install and repair rail fastening systems	**AND**	TLIB2085 - Apply track fundamentals	
Remove and install sleeper plates, pads and insulators	CRN CM 231	TLIS2031 - Install railway sleepers	**AND**	TLIS2034 - Install and repair rail fastening systems	**AND**	TLIB2085 - Apply track fundamentals	
Rebore and regauge sleepers	CRN CM 231	TLIS2031 - Install railway sleepers	**AND**	TLIS2034 - Install and repair rail fastening systems	**AND**	TLIB2085 - Apply track fundamentals	

Table 2 Technical Competency Requirements for Track Activities						
To carry out this work	Ref Manual	You need these competencies				
Certify track during or after resleepering	CRN CM 231	Certify plain track after track examination Competencies	**AND**	TLIS2031 - Install railway sleepers		
Authorise use of standard steel sleeper component combinations	CRN CM 231	EA3 Track granted by Principal Track and Civil Engineer				
Restore ballast profile either manually or with ballast regulators and stabilisers	CRN CM 241	TLIS2030 - Carry out track ballasting	**AND**	TLIB2085 - Apply track fundamentals		
Lay ballast from ballast trains or using off-track plant	CRN CM 241	TLIS3025 - Implement ballast unloading	**AND**	TLIB2085 - Apply track fundamentals		
Remove ballast from sleeper bays or shoulders by manual methods, mechanical excavation with off track plant, ballast sleds, ballast undercutters or ballast cleaners	CRN CM 241	TLIS2030 - Carry out track ballasting	**AND**	TLIB2085 - Apply track fundamentals		
Load spent ballast wagons	CRN CM 241	TLIS3037 - Install and repair rail earthworks **OR** TLIS2030 - Carry out track ballasting	**AND**	TLIB2085 - Apply track fundamentals		
Certify track during or after ballasting	CRN CM 241	Certify plain track after track examination Competencies				
Repair turnout components – including switches, stockrails, crossings and checkrails	CRN CM 251	TLIB3095 - Check and repair points and crossings	**AND**	TLIB2085 - Apply track fundamentals		
Renew turnout components – including switches, stockrails, crossings and checkrails	CRN CM 251	TLIB3095 - Check and repair points and crossings	**AND**	TLIB2085 - Apply track fundamentals		
Spike points “out of use” on timber, concrete and steel bearers	CRN CM 251	TLIB3095 - Check and repair points and crossings	**AND**	TLIB2085 - Apply track fundamentals		
Remove and install track plates, pads and insulators	CRN CM 251	TLIS2031 - Install railway sleepers	**AND**	TLIS2034 - Install and repair rail fastening systems	**AND**	TLIB2085 - Apply track fundamentals

Table 2 Technical Competency Requirements for Track Activities							
To carry out this work	Ref Manual	You need these competencies					
Remove and install turnout bearers	CRN CM 251	TLIS2031 - Install railway sleepers	**AND**	TLIS2034 - Install and repair rail fastening systems	**AND**	TLIB2085 - Apply track fundamentals	
Rebore and regauge bearers	CRN CM 251	TLIS2031 - Install railway sleepers	**AND**	TLIS2034 - Install and repair rail fastening systems	**AND**	TLIB2085 - Apply track fundamentals	
Drill switches and stockrails	CRN CM 251	TLIB3095 - Check and repair points and crossings **OR** TLIS3040 - Construct concrete or steel points and crossings **OR** TLIS3041 - Construct timber or composite points and crossings			**AND**	TLIB2085 - Apply track fundamentals	
Grind switches and crossings	CRN CM 251	TLIW3013 - Grind switches and crossings			**AND**	TLIB2085 - Apply track fundamentals	
Build turnouts and special trackwork with timber or composite bearers	CRN CM 251	TLIS3041 - Construct timber or composite points and crossings			**AND**	TLIB2085 - Apply track fundamentals	
Build turnouts and special trackwork with steel or concrete bearers	CRN CM 251	TLIS3040 - Construct concrete or steel points and crossings			**AND**	TLIB2085 - Apply track fundamentals	
Install turnouts and special trackwork	CRN CM 251	TLIS3045 - Install turnouts			**AND**	TLIB2085 - Apply track fundamentals	
Install and maintain manual points levers and points rodding on non-interlocked turnouts	CRN CM 251	TLIB3095 - Check and repair points and crossings			**AND**	TLIB2085 - Apply track fundamentals	
Restore ballast profile after work on turnouts	CRN CM 251	TLIS2030 - Carry out track ballasting			**AND**	TLIB2085 - Apply track fundamentals	
Certify track during or after repair or renewal of turnout components – including switches, stockrails, crossings and checkrails and point levers	CRN CM 251	Certify turnouts & special trackwork after track examination Competency					
Certify track during or after installation of turnouts and special trackwork	CRN CM 251	Certify turnouts & special trackwork after track examination Competency					
Determine Rail Lubrication Strategy	CRN CS 220	CRN Rail Engineer			**OR**	Nominated by Principal Track and Civil Engineer	

Table 3 - Technical Competency Requirements for Track Resurfacing Activities			
To carry out this work	Ref Manual	You need these competencies	
Travel resurfacing machines	CRN CM 211	TLIC2058 - Travel medium or heavy self-propelled on-track equipment	
Mark track for resurfacing	CRN CM 211	TLIS3039 - Measure and mark track for resurfacing	
Resurface plain track	CRN CM 211	TLIB3094 - Check and repair track geometry	
Operate tamping machine	CRN CM 211	TLIW2032 Identify the principles of tamping machine operations	**AND** Licence for the machine being operated **AND** The following **Resurfacing plain track** CORE competencies ~ TLIB2085 - Apply track fundamentals ~ TLIS2030 - Carry out track ballasting ~ TLIB2091 - Measure and record track geometry ~ Travel medium/heavy equipment
Operate Ballast Regulator	CRN CM 211	TLIW2029 - Identify the principles of ballast regulator operations	**AND** Licence for the machine being operated **AND** **Resurfacing plain track** CORE competencies
Operate Dynamic Track Stabiliser	CRN CM 211	TLIW2030 Identify the principles of dynamic track stabiliser operations	**AND** Licence for the machine being operated **AND** **Resurfacing plain track** CORE competencies
Resurface turnouts or other special trackwork using tampers	CRN CM 211	TLIB3094 - Check and repair track geometry	**AND** TLIB2085 - Apply track fundamentals
Certify plain track during or after resurfacing	CRN CM 211	Certify plain track after track examination Competencies	
Certify turnouts and special trackwork (EXCEPT “Vulnerable turnouts”) during or after resurfacing	CRN CM 211	Certify plain track after track examination Competencies	
Certify “Vulnerable turnouts” during or after resurfacing	CRN CM 211	Certify turnouts & special trackwork after track examination Competency	

Table 4 - Technical Competency Requirements for Structures Activities						
To carry out this work	Ref Manual	You need these competencies				
Locate & identify defects in structures	CRN CM 302 CRN CM 111 CRN CM 112	TLIB2086 Apply awareness of structures fundamentals				
Detailed examination of structures	CRN CM 302 CRN CM 111 CRN CM 112	TLIB3098 - Examine concrete/masonry structures TLIB3088 - Examine steel structures TLIB3087 - Examine timber structures	**AND**	The following CORE competencies TLIB2086 - Apply awareness of structures fundamentals Carry out routine maintenance of structures TLIB2096 - Repair concrete/masonry structures TLIB2082 - Repair steel structures TLIB2081 - Repair timber structures TLIB2083 - Maintain bridge bearings		
Mid-cycle examination of structures	CRN CM 302 CRN CM 111 CRN CM 112	Detailed examination of structures competencies				
Special examination of structures	CRN CM 302 CRN CM 111 CRN CM 112	Detailed examination of structures competencies				
Timber pole examination	CRN CM 302	Detailed examination of structures competencies	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Roadside Inspection of Overbridges	CRN CM 302 CRN CM 112					
Structure damage assessment	CRN CM 302 CRN CM 111 CRN CM 112 CRN CM 305	Detailed examination of structures competencies	**AND**	Structures assessment (EA Level 3)		
Cursory examination of structures	CRN CM 302	TLIB3100 - Visually inspect track infrastructure				
Specialist testing of steel structures	CRN CM 302 CRN CM 111	MEM24001 - Perform basic penetrant testing	**OR**	MEM24003 - Perform basic magnetic particle testing		
Underwater examination of structures	CRN CM 302 CRN CM 304 CRN CM 111	Accredited diver + Structures knowledge				
Structures Assessment	CRN CM 305	Engineering Authority (EA Level 3) Structures				
Assessment of unsupported timber poles	CRN CM 305	Detailed examination of structures competencies	**AND**	Structures assessment (EA Level 3)		
Maintain structures selecting repair actions	CRN CM 303 CRN CM 305	TLIB2096 - Repair concrete/masonry structures **OR**	**AND**	Structures assessment (EA Level 3)	**AND**	TLIB2086 - Apply awareness of structures fundamentals

Table 4 - Technical Competency Requirements for Structures Activities						
To carry out this work	Ref Manual	You need these competencies				
		TLIB2081 - Repair timber structures **OR** TLIB2082 - Repair steel structures				
Maintain structures replace/tighten bolts clean abutments clean weep holes	CRN CM 301	TLIB2084 - Carry out routine maintenance of structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Maintain structures replace bearing plates and pads	CRN CM 301 CRN CM 303 CRN CP 301	TLIB2083 - Maintain bridge bearings	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Maintain structures concrete repair sub-procedures(Note 1) concrete repairs(Note 1) masonry repairs(Note 1)	CRN CM 301 CRN CM 303 CRN CP 301	TLIB2096 - Repair concrete/masonry structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Maintain structures steel repair sub-procedures	CRN CM 301 CRN CM 303	TLIB2082 - Repair steel structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Maintain structures timber repair procedures	CRN CM 301 CRN CM 303	TLIB2081 - Repair timber structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Maintain structures steel repairs(Note 1)	CRN CM 303	TLIB2082 - Repair steel structures	**AND**	Certificate III in Engineering – Fabrication Trade	**A N D**	TLIB2086 - Apply awareness of structures fundamentals
Repair impact damage to steel structures by grinding(Note 2)	CRN CM 303	TLIB2082 - Repair steel structures	**AND**	Certificate III in Engineering – Fabrication Trade	**A N D**	TLIB2086 - Apply awareness of structures fundamentals
Repair concrete structures(Note 1)	CRN CM 303	TLIB2096 - Repair concrete/masonry structures	**AND**	Certificate III or equivalent(Note 3)	**A N D**	TLIB2086 - Apply awareness of structures fundamentals
Repair masonry structures(Note 1)	CRN CM 303	TLIB2096 - Repair concrete/masonry structures	**AND**	Certificate III or equivalent(Note 4)	**A N D**	TLIB2086 - Apply awareness of structures fundamentals
Repair structures using epoxies and grouts	CRN CM 303	TLIS2036 - Use chemical repair products	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Patch painting of steel structures	CRN CM 303	TLIW3034 - Apply protective coating systems to structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Install bearings	CRN CP 301	TLIB2083 - Maintain bridge bearings	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Remove and install transoms	CRN CM 311	TLIS2028 - Install and replace transoms	**AND**	TLIB2086 - Apply awareness of structures fundamentals		

Table 4 - Technical Competency Requirements for Structures Activities						
To carry out this work	Ref Manual	You need these competencies				
Rebore and regauge transoms	CRN CM 231	TLIS2031 - Install railway sleepers	**AND**	TLIS2034 - Install and repair rail fastening systems	**AND**	TLIB2086 - Apply awareness of structures fundamentals
Install earthworks protection structures	CRN CP 301	TLIS2013 - Install minor structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Erect retaining walls	CRN CP 301	TLIS2013 - Install minor structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Install guard rails	CRN CM 301	TLIB2097 - Install and maintain guard rails	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Install track baulks	CRN CM 301	TLIS2033 - Install and repair temporary track supports	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Install ballast retention wall	CRN CM 301	TLIS2013 - Install minor structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Install ballast logs	CRN CM 301	TLIS2013 - Install minor structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Install intermediate rail support on ballast walls	CRN CM 301	TLIS2013 - Install minor structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Install/maintain bridge ends Separate competencies for removal, installation and certification of track	CRN CM 301	TLIS3037 - Install and repair rail earthworks	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Install/maintain buffer stops	CRN CM 331	TLIS2013 - Install minor structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Install pipes & culverts	CRN CM 421	TLIS2013 - Install minor structures	**AND**	TLIB2086 - Apply awareness of structures fundamentals		
Certify structure safe for trains after detailed structures examination, underwater examination, monthly broad flange beam examination	CRN CM 302 CRN CM 305	Detailed examination of structures competencies	**AND**	Structures assessment (EA Level 3)		
Certify structure safe for trains after special examination (Does not include certification of track)	CRN CM 302 CRN CM 305	Detailed examination of structures competencies	**AND**	Structures assessment (EA Level 3)		
Certify structure safe for trains after repair work (Does not include certification of track)	CRN CM 305	TLIB2096 - Repair concrete/masonry structures OR TLIB2081 - Repair timber structures	**AND**	Structures assessment (EA Level 3)	**AND**	TLIB2086 - Apply awareness of structures fundamentals

Table 4 - Technical Competency Requirements for Structures Activities							
To carry out this work	Ref Manual	You need these competencies					
		OR TLIB2082 - Repair steel structures					
Certify structure safe after installation of transoms (Does not include certification of track)	CRN CM 305 CRN CM 311	TLIS2028 - Install and replace transoms	**AND**	Structures assessment (EA Level 3)	**AND**	TLIB2086 - Apply awareness of structures fundamentals	
Certify structure safe for trains after installation of minor structures (Does not include certification of track)	CRN CM 305	TLIS2013 - Install minor structure	**AND**	Structures assessment (EA Level 3)	**AND**	TLIB2086 - Apply awareness of structures fundamentals	
Certify structure safe for trains after installation of temporary track supports (Does not include certification of track)	CRN CM 305	TLIS2033- Install and repair temporary track supports	**AND**	Structures assessment (EA Level 3)	**AND**	TLIB2086 - Apply awareness of structures fundamentals	

Table 5 - Technical Competency Requirements for Geotechnical Activities				
To carry out this work	Ref Manual	You need these competencies		
Detailed examination of nominated Geotechnical risk sites	CRN CM 401	TLIB3100 - Visually inspect track infrastructure	**AND**	Training in Recognising Geotechnical Problems
Detailed examination of earthworks	CRN CM 401	TLIB3099 - Examine track infrastructure		
Supervision of Earthworks	CRN CM 411	Site Supervisor		
Supervision of Geotechnical Repairs	CRN CM 401	Site Supervisor		
Certification of the track during earthworks or after earthworks has been completed	CRN CM 411 CRN CM 421	TLIB3094 - Check and repair track geometry		

Table 5 - Technical Competency Requirements for Geotechnical Activities		
To carry out this work	Ref Manual	You need these competencies
Certification of the track during or after geotechnical repairs	CRN CM 401	TLIB3094 - Check and repair track geometry
Undertake track reconditioning that involves reconstruction of track formation and capping	CRN CM 241 CRN CM 403	TLIS3037 - Install and repair rail earthworks
Certification of the track during track reconditioning or after track reconditioning has been completed	CRN CM 241 CRN CM 403	TLIS3037 - Install and repair rail earthworks **AND** TLIB3094 - Check and repair track geometry
Supervision of surface and subsurface drainage construction	CRN CM 421	Site Supervisor
Install / repair surface track drainage	CRN CM 421	TLIS2027 - Install and maintain surface track drainage
Install subsurface drains	CRN CM 421	RIICRC203 - Install sub-soil drainage
Excavate along or across track (less than 1.5 metre depth)	CRN CM 421	TLIS3037 - Install and repair rail earthworks

Table 6 Technical Competency Requirements for Right of Way Activities		
To carry out this work	Ref Manual	You need these competencies
Supervise Burning off	CRN CM 501	AHCILM509 “Plan burning activities for natural and cultural resource management
Issue a Hot Work Authority	CRN CM 501	Authorised Officer (See CRN CM 501)
Act as fire watch for hot work during a total fire ban	CRN CM 501	Trained in the use of fire fighting equipment
Install fences and gates	CRN CM 511	TLIS2035 - Install and repair fences and gates
Install cattle stops	CRN CM 511	TLIS2013 - Install minor structures

Table 6 Technical Competency Requirements for Right of Way Activities				
To carry out this work	Ref Manual	You need these competencies		
Repair fences and gates	CRN CM 511	TLIS2035 - Install and repair fences and gates		
Inspect cattle stops (grid type)	CRN CM 511	**Track Examination** competencies		
Inspect cattle stops (structure type)	CRN CM 511	**Structures Examination** competencies		
Inspect fences and gates	CRN CM 511	**Track Examination** competencies	**OR**	TLIS2035 - Install and repair fences and gates
Repair of cattle stops	CRN CM 511	TLIS2013 - Install minor structures		
Installation of level crossings	CRN CM 521	TLIS2013 - Install minor structures		
Installation of modular type crossings level crossings	CRN CM 521	TLIS2013 - Install minor structures	**AND**	Training in the manufacturer's procedures for installation.
Inspection of level crossings	CRN CM 521	**Track Examination** competencies		
Maintenance of track aspects of level crossing structure	CRN CM 521	TLIS2013 - Install minor structures	**AND**	Training in the manufacturer's procedures for installation.
Maintenance of track aspects of level crossings	CRN CM 521	Relevant track competencies		
Track Assessor (measure and assess track geometry at the site of an undertrack crossing)	CRN CM 541	**Track Examination** competencies	**AND**	TLIB3094 - Check and repair track geometry
Determine that a proposed underbore may be categorised as a 'minor' underbore	CRN CM 541	with Engineering Authority		

Appendix 2 Competency - Activity Matrix

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIB2085 - Apply track fundamentals	1. Identify • track and structures terminology • track components • track tools and equipment 2. Undertake basic track measurement	• Understand basic track terminology • Identify common track components, tools and equipment • Measure and record gauge, line, alignment, super, track centres, rail dimensions and gaps and rail temperature	•	• This is the fundamental requirement needed to undertake track activities
TLIS3039 - Measure and mark track for resurfacing	1. Mark resurfacing ramp in/ramp out points 2. Mark/protect obstructions 3. Measure and record track geometry 4. Determine and mark machine offsets	• Plan and organise work requirements • Select and use equipment and tools • Identify obstruction to resurfacing • Provide protection of obstructions • Identify resurfacing points • Measure geometry • Calculate machine offsets • Complete documentation	•	• You also need TLIB2085 - Apply track fundamentals
TLIB2091 - Measure and record track geometry	1. Measure geometry, including • top, surface • line, alignment • twist, superelevation • gauge • track centres, lateral or vertical clearances 2. Record results	• Select and use equipment and tools • Take accurate measurements • Complete documentation	•	• You also need TLIB2085 - Apply track fundamentals
TLIS3026 - Implement track maintenance and construction	1. Plan maintenance /construction work 2. Implement maintenance activities of a team at a worksite 3. Deal with maintenance and construction problems affecting track integrity at the worksite	• Understand impact of defects on track integrity • Identify and use appropriate range of track repair and construction techniques • Select appropriate tools, equipment and competencies • Monitor work performance for technical and performance issues • Implement contingency plans for unexpected events during work activities	•	• You also need TLIB2085 - Apply track fundamentals

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIS2031 - Install railway sleepers	1. Remove and install sleepers and turnout bearers manually or with mechanical handling / lifting equipment 2. Install sleeper plates, pads and insulators 3. Pack sleepers and bearers 4. Rebore and regauge sleepers and bearers	• Plan and organise work requirements • Select and use equipment and tools • Remove and replace sleepers safely, to the correct spacing and skew • Install sleeper plates , pads and insulators correctly • Correct gauge • Pack sleepers correctly • Complete relevant records and documentation	•	• You also need TLIB2085 - Apply track fundamentals • You also need TLIS2034 - Install and repair rail fastening systems
TLIS2034 - Install and repair rail fastening systems	1. Install, remove and maintain sleeper fastenings and anchors including • Dogspikes and lockspikes • Screwspikes • Dogscrew and lockscrews • Anchors • Resilient fastenings • special fastenings in points and crossings	• identify defects and appropriate repair methods • Select and use equipment and tools • install fastening systems	•	• You also need TLIB2085 - Apply track fundamentals
TLIW3035 - Heat and cut materials using oxy-LPG equipment for the rail industry	1. Cut rail using Oxy/LPG 2. Cut scrap material	• Plan and organise work requirements • Select and use equipment and tools • Identify Oxy-LPG heating and cutting equipment set-up and operating techniques	• You CAN'T trim rail ends prior to welding • You CAN'T cut structural steel	• You also need TLIB2085 - Apply track fundamentals

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIS2044 - Carry out rail installation	1. Load and unload rails 2. Remove and install rail 3. Prepare rail ends for welding 4. Install rail joints. This includes • cutting rail • crowing rail ends • boring bolt holes 5. Install / restore rail fastenings 6. Use rail bonds	• Identify visible rail defects • Measure rail weight/dimensions • Load and unload rails • Cut rails to required length using an appropriate methods • Drill rail ends or prepare for welding • Install rail joints • Crow rails to the correct curvature • Unfasten and remove rail using appropriate equipment or manual methods including mechanical handling / lifting equipment, track machines • Lay new rail using appropriate equipment or manual methods including mechanical handling / lifting equipment, track machines • Install rail fastenings • Install/restore temporary rail bonds or other track circuit connections • Complete relevant records and documentation	• You CAN'T Adjust rail stress • You CAN'T Install/restore rail bonds or other track circuit connections on rail lengths longer than 6m • You CAN'T Load and unload rail trains or use the Robel Rail Train	• You also need TLIB2085 - Apply track fundamentals • Additional module of competency required to Load and unload rail trains or use the Robel Rail Train • 1Must be trained by a Signal Engineer to use rail bonds
TLIB2121 - Maintain rail joints	1. Repair rail joints. This includes: • correcting anchor pattern • pulling joint apart • identifying and replacing worn or broken fishplates, bolts and insulation • adjusting alignment at joints 1. Install rail joints. This includes • cutting rail • crowing rail ends • boring bolt holes • assembling joint	• Identify rail defects in a joint • Measure and repair rail • Refasten and adjust the fit of rail components at a joint (line, profile match, gauge face alignment, curvature • Use hand tools including impact wrench, grinder, tension friction rail saw, velocity rail punch, and wrench, fastening equipment, cutting and boring equipment, rail tensors • Cut rails to required length using an appropriate methods • Drill rail ends or prepare for welding • Install rail joints • Crow rails to the correct curvature	• You CAN'T Install sleepers • You CAN'T Adjust rail stress	• You also need TLIB2085 - Apply track fundamentals • You also need TLIS2034 - Install and repair rail fastening systems

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIB2097 - Install and maintain guard rails	1. Fabricate/Assemble guard rails on bridges, level crossings and in open track 2. Remove and install guard rails	• Identify defects and variations from allowable tolerances • Determine work requirements • Fabricate/Assemble guard rails in accordance with specifications • Remove and replace guard / check rails • use tools and equipment including mechanical lifting and handling devices, hand tools, small plant • Complete relevant records and documentation	•	• You also need TLIB2085 - Apply track fundamentals •
TLIS2012 - Install and service rail lubrication equipment	1. Install and remove rail lubricators 2. Maintain lubricators • cleaning and adjustment • replacing components • adding lubricant • checking operation 3. Check Rail Lubricators prior to operation of rail flaw detection vehicles	• Plan and organise work requirements • Select and use required tools, equipment and materials • Install lubrication equipment • Fit and operate rail lubrication equipment • Check and service rail lubrication equipment • Complete relevant documentation	• You CAN'T Install or maintain Wheel Squeal applicators	• You also need TLIB2085 - Apply track fundamentals • To Install or repair Top of Rail Friction Modifiers additional training is required in the applicable Top of Rail Friction Modifier
TLIS2030 - Carry out track ballasting	1. Remove ballast including: • Manual excavation in sleeper bays • Manual or mechanical removal of shoulder ballast • Mechanical excavation with FEL, ballast sled, ballast undercutters, ballast cleaners 2. Load spent ballast wagons 3. Lay ballast from: • Ballast wagons and hoppers • Front end loaders • Road trucks 4. Restore ballast profile including: • Manual boxing up to correct deficiencies • Ballast ploughs, ballast regulators	• Plan and organise work requirements • Identify obstacles in work area and arrange removal or protection • Select suitable ballast for job requirements • Plan ballast unloading operations • Establish appropriate site communications for ballast train operations • Unload ballast from Ballast wagons safely (both night and day) • Select and use appropriate methods and equipment for restoring ballast profile • Restore ballast profile to standard	• You CAN'T operate on or off track plant unless you also have appropriate competencies • You CAN'T unload ballast from Ballast trains or operate a ballast plough van	• You also need TLIB2085 - Apply track fundamentals • Additional module of competency required to unload ballast from ballast trains and operate ballast plough vans

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIS3025 - Implement ballast unloading	1. Plan ballast unloading • Identify and protect or remove obstacles in work area • Determine ballast quantities 2. Unload ballast from • Ballast trains • Front end loaders etc. 3. Distribute ballast to allow safe operation of trains 4. Remove ballast from sensitive infrastructure to ensure safe operation of trains	• Manage/conduct the loading and unloading of ballast from ballast wagons, stockpile, regulators and ballast cleaners • Identify infrastructure to be protected	•	• You also need TLIB2085 - Apply track fundamentals •
TLIB3102 - Adjust rail	1. Undertake rail adjustment including • Conversion of jointed track to CWR • Adjustment of existing CWR • Adjustment of existing jointed track • Measurement of adjustment of jointed track • Measurement of adjustment of CWR by "cut and adjust" method • Repair of rail defects by "Rail in Rail out" method • Installation/resetting of Creep Control Marks in CWR track • Visual examination and adjustment check (punch mark check)of welds • Checking adjustment at misalignments 2. Certify that rail adjustment has been undertaken correctly	• Understand basic rail adjustment theory and critical aspects of rail stress • Establish appropriate adjustment length • Understand temperature and alignment limitations on adjustment • Measure and calculate adjustment condition • Use rail adjustment procedures for adjustment in resilient and non-resilient fastenings, Concrete and timber track, Plain track, joints and at fixed points • Use "rail in rail out" method appropriately and correctly • Restore anchors to correct pattern in plain track, joints and at fixed points • Establish anchor points and destress rail • adjust rail length using appropriate method to achieve desired rail stress • Restore fastenings using appropriate methods • Install and reset Creep control Marks in CWR track • Complete documentation and record keeping requirements	• You CAN'T Measure adjustment of CWR by Welded Track Stability measurement and analysis • You CAN'T Carry out Welding operations • You CAN'T Certify welding operations • You CAN'T Certify the track section safe for operation of trains	• You also need TLIB2085 - Apply track fundamentals • 2To certify that adjustment is undertaken correctly, you also need TLIS2034 - Install and repair rail fastening systems; TLIS2044 - Carry out rail installation
TLIW3015 - Weld rail using aluminothermic welding process	1. Prepare rail for welding	• Select and use tools, equipment and materials • Select and appropriately use protective clothing	• You CAN'T Weld using a process for which you have not	• You also need TLIB2085 - Apply track fundamentals

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
	2. Carry out the aluminothermic welding processes for which you are licenced 3. Use the “Rail in Rail out” process to insert closures 4. Correct rail and track geometry at the weld 5. Certify that the weld has been installed correctly	• Cut and line up rail for welding • Carry out aluminothermic welding process • Grind rail to specification after welding • Restore track geometry • Complete relevant documentation	been trained or certified competent • You CAN'T Certify the track section safe for operation of trains • You CAN'T Undertake Rail adjustment other than the “Rail in Rail out” process	• Separate certification is required for each welding process • TLIS2034 - Install and repair rail fastening systems; TLIS2044 - Carry out rail installation
TLIW2012 - Grind rails	1. Undertake rail grinding of • New welds • Weld repairs • Surface defects	• Select and use tools, equipment and materials • Select and appropriately use protective clothing • Grind rail to specification • Check rail for acceptance after work using measuring tools		• You also need TLIB2085 - Apply track fundamentals •
TLIW0036 - Apply electric welding process to rail	1. Carry out Wire Feed Welding on: • Crossings • Wingrails • Plain track 2. Use non-destructive test methods (dye penetrant or mag particle testing) to check repair area for defects 3. Certify that the weld has been installed correctly	• Identify Weld requirements from specifications and/or drawings. • Correctly prepare material using appropriate tools and techniques including preheating, setting up of jigs, fixtures, clamps, etc. • Assembled/align materials • Identify welding machine settings accessories and consumables • Assemble and set up welding equipment. • Select and use appropriate distortion prevention measures • Select and use appropriate measures to rectify distortion • Carry out welding operation • Clean joints • Remove defects with minimum loss of sound metal using correct and appropriate techniques and tools, including oxyacetylene, air arc equipment, grinders. • Visually inspect weld joints • Complete weld records	• You CAN'T undertake weld repairs of MANGANESE crossings unless you have been given additional training • You CAN'T Certify the track section safe for operation of trains	• You also need TLIB2085 - Apply track fundamentals • Repairs to MANGANESE crossings can only be done using the "Robotic Welder" • Activities associated with welding that can only be certified by a person with TLIB3094 - Check and repair track geometry include sleeper fastenings, sleeper condition, spacing & skew, safety clearances, geometry

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIB3100 - Visually inspect track infrastructure	1. Undertake Visual Track Patrol by: • Walking • Engine • Hi-rail vehicle (Day & Night) • Patrol includes inspection of track, earthworks, drainage, signage, right of way & fencing for major defects that may derail the next train 2. Undertake Front of Train Examinations 3. Undertake patrol of track in abnormal weather conditions (Wet weather and Heat Patrol) 4. Undertake patrol of track in Winter and Summer to identify seasonal hazards 5. Undertake Special Inspection/ Monitoring of Sharp Curves prior to Summer 6. Visual examination and adjustment check of rail welds (punch mark check) 7. Cursory examination of structures during patrol 8. Undertake detailed examination of nominated Geotechnical risk sites 9. Undertake Geotechnical surveillance inspections 10. Identify , record and report defects 11. Assess and protect major defects that may derail the next train	• Identify different types of defects • Understand how defects deteriorate under differing operating conditions • Establish seriousness of defects • Apply Base Operating Limits • Take appropriate action for serious defects • Record and report inspection results • Use basic tools and equipment • Use measuring equipment	• You CAN'T Undertake detailed examination of track condition • You CAN'T Vary Base Operating conditions	• You also need TLIB2085 - Apply track fundamentals • You also need training in CRN CM 404 “Recognising Geotechnical Problems” to undertake geotechnical inspections • You also need TLIB2085 - Apply track fundamentals •

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIB3099 - Examine track infrastructure	1. Undertake detailed examination of: • Track Structure including • Rail, rail joints, lubrication and fastenings • Sleepers and sleeper fastenings • Ballast • Drainage • Turnouts & special trackwork • Clearance to structures and other tracks • Earthworks • Signage • Right of Way & Fencing • Cattle Stops • Level Crossings • Stop blocks 2. Undertake Welded Track Stability Analysis using Manual analysis techniques 3. Undertake Post Irregularity examination of items in (1) above 4. Measure and record track parameters 5. Assess condition 6. Assess security of Broken rails for continued operation of trains 7. Investigate siding derailments or Low level mainline derailments where track IS NOT involved in cause 8. Measure and assess track geometry at the site of an undertrack crossing)	• Plan, prioritise and organise work requirements • Select and use appropriate track examination equipment • Identify different types of defects • Understand track deterioration rates under differing operating conditions • Establish seriousness of defects • Read and analyse Track Recording graphs • Apply Base Operating Limits • Assess application of BOS to track defects • Measure, calculate and record data accurately • Analyse data and prioritise identified defects • Take appropriate action to repair or protect defects	• You CAN'T Vary Base Operating conditions	• You also need TLIB2085 - Apply track fundamentals • You also need TLIB3100 - Visually inspect track infrastructure • You also need TLIB3094 - Check and repair track geometry to undertake Post Irregularity examination

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIB3094 - Check and repair track geometry		• Identify track geometry defects • Determine work requirements and work methods • Select and use appropriate lifting and lining methods and equipment to correct geometry defects • Use appropriate measurement methods to assess and correct geometry defects. • Identify defects in track structure (sleeper condition, spacing, fastening condition, rail joint condition, ballast profile and packing) affecting safe operation • Identify structure and track centre clearance defects affecting safe operation • Identify defects in earthworks affecting safe operation • Assess defects against Base Operating standards and apply appropriate restrictions • Use basic hand tools and small plant • Understand track stability and the requirements for Work in Summer months	• You CAN'T lift crippled welds with a Weld Straightener. • You CAN'T Certify track after repair or installation of turnouts • You CAN'T Certify track after resurfacing 'vulnerable turnouts" • You CAN'T Certify that welds have been undertaken correctly • You CAN'T Certify that rail adjustment has been undertaken correctly • NOTE: You CAN certify the condition of the track after welding and adjustment (sleepers restored, fastenings, geometry etc. • Does not include the activity itself but certification afterwards regarding any effect on track	• You also need TLIB2085 - Apply track fundamentals • This is the principal competency for certification of track after work that may affect the running lines. • It includes the requirement to verify that other competent staff have certified their component of the task (e.g. welding) • You need an additional module of competency to lift crippled welds using a Weld Straightener • You also need TLIB3095 - Check and repair points and crossings to certify track after work on turnouts • To Certify track you must also be competent in the activities you are certifying • e.g. to certify track after rerailing you need TLIS2044 - Carry out rail installation as well as TLIB3094 - Check and repair track geometry • You need TLIB3095 - Check and repair

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
				points and crossings to certify track after resurfacing work at a “vulnerable turnout” site • A “Vulnerable” turnout is generally in poor condition and resurfacing the turnout may affect switch and crossing geometry and component fit. It is defined in CRN CM 251 • You also need training in the use of a weld straightener to straighten dipped welds
TLIB3095 - Check and repair points and crossings	1. Undertake maintenance and repairs on special trackwork including: • Turnouts, Diamonds, Slips, Catchpoints, Expansion switches • Repairs include: • Identifying defects • Adjusting components to achieve tolerances • Replacing bolts, fastenings, plates, bearers, switches, crossings, stockrails, checkrails, Manual Points Levers • Drilling switches and stockrails 2. Certify the track safe for operation of trains after work on turnouts and other special trackwork. This includes • Adjusting switch and crossing clearances • Replacing bearers, respiking or respacing	• Understand special maintenance requirements in turnouts • Identify special trackwork defects • Determine work requirements and work methods • Select and use appropriate methods and equipment to correct defects • Use appropriate measurement methods to assess and correct defects. • Lubricate and adjust existing components • Remove and replace defective components • Adjust maintain, remove and install Manual Points Levers • Carry out functional checks after work has been completed • Measure and compare completed work to Construction or Maintenance acceptance limits • Identify defects in special trackwork affecting safe operation	• You CAN'T Certify that welds have been undertaken correctly • You CAN'T Certify that rail adjustment has been undertaken correctly • NOTE: You can certify the condition of the special trackwork after welding and adjustment (bearers restored, fastenings, geometry etc • You CAN'T Certify the following aspects of track • General track geometry	• You also need TLIB2085 - Apply track fundamentals • This is an ADD-ON to TLIB3094 - Check and repair track geometry. • It is expected that you will become competent in TLIB3094 - Check and repair track geometry before you reach this competency. • You also need TLIB3094 - Check and repair track geometry to certify track after work on

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
	• Replacing special trackwork components (not welding or adjustment) 3. Certify the track safe for operation of trains after resurfacing of "Vulnerable Turnouts" 4. Certify the track safe for operation of trains after. Installing turnouts and other special trackwork	• Assess defects against Base Operating standards and apply appropriate restrictions • Complete relevant documentation accurately	• Earthworks (trenching, benching, boring or excavation) in the immediate vicinity of the track • Erection of any structure adjacent to or over the track (safe clearances)	or examination of turnouts • To certify track you must also be competent in the activities you are certifying
TLIW3013 - Grind switches and crossings	1. Undertake rail grinding of • Weld repairs in crossings • Surface defects in switches, crossings and stockrails • Crossing noses following installation / maintenance 2. Apply crossing profiles	• Understand grinding methods • Understand issues relating to profiles in crossings switches and stockrails • select and use tools, equipment and materials • select and appropriately use protective clothing • grind switches crossings and stockrails to specification • check switches, crossings and stockrails for acceptance after work using measuring tools	•	• You also need TLIB2085 - Apply track fundamentals •
TLIS3040 - Construct concrete or steel points and crossings	1. Layout and assemble special trackwork with timber or composite bearers including: • Turnouts, Diamonds, Slips, Catchpoints, Expansion switches • Drill switches and stockrails 2. Prepare special trackwork for transport	• Understand features and principles of operation of points and crossings • Plan and organise work requirements • Determine work requirements and resources required • Select and prepare assembly site • Assemble special trackwork according to design specification • Check assembly for compliance to design • Complete relevant documentation	• You CAN'T install special trackwork	• You also need TLIB2085 - Apply track fundamentals •
TLIS3041 - Construct timber or composite points and crossings	1. Layout and assemble special trackwork with timber or composite bearers including: • Turnouts, Diamonds, Slips, Catchpoints, Expansion switches • Drill switches and stockrails 2. Prepare special trackwork for transport	• Understand features and principles of operation of points and crossings • Plan and organise work requirements • Determine work requirements and resources required • Select and prepare assembly site • Measure and select appropriate bearers • Assemble special trackwork according to design specification	• You CAN'T install special trackwork	• You also need TLIB2085 - Apply track fundamentals •

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
		• Check assembly for compliance to design • Complete relevant documentation		
TLIS3045 - Install turnouts	1. Install special trackwork including: • Turnouts, Diamonds, Slips, Catchpoints, Expansion switches	• Understand features and principles of operation of points and crossings • Plan and organise work requirements • Determine work requirements and resources required • Remove existing track and other obstacles • Install new points and crossings according to design. • Install Manual points levers • Restore track ballast and geometry • Check track geometry and operational aspects for compliance to standards • Complete relevant documentation	• You CAN'T Certify track after installation of turnouts	• You also need TLIB2085 - Apply track fundamentals • The following competencies are required to certify track after installation of turnouts: • TLIB3095 - Check and repair points and crossings for • bearer condition spacing, • fastening condition and fit, • steelwork condition, fit and geometry, • switch and crossing clearances • TLIB3094 - Check and repair track geometry for • General Geometry • Earthworks (trenching, benching, boring or excavation) • Erection of any structure adjacent to or over the track (safe clearances)

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIS3010 - Test rail using ultrasonic equipment	1. Perform ultrasonic testing on 2. Plain rail and field welds (aluminothermic and wirefeed) 3. Test alignment of field welds 4. Visual examination and adjustment check (punch mark check) of field welds 5. Measure, record and assess geometry of weld repairs (aluminothermic and wirefeed) 6. Interpret, classify and report the results of ultrasonic tests 7. Accept or reject welds and weld repairs (aluminothermic and wirefeed)	• Understand the principles of ultrasonic testing • Understand ultrasonic probes, beam, their characteristics and screen display • Understand Beam angles and probes required to locate various defect types. • Identify, clean and prepare inspection areas for testing using appropriate procedures and materials. • Visually assess inspection areas and identify and classify obvious discontinuities • Identify types of rail defects • Select probes to use to locate each type of defect • Check and maintain ultrasonic testing equipment • Calibrate ultrasonic testing equipment • Set up probes for each type of test • Test with appropriate probes for each type of defect • Understand screen indications • Locate, measure and assess defect size for all defect types • Use Sizing definitions • Carry out additional – visual and geometry assessments for field welds • Locate and size Bolt hole defects • Apply special testing requirements for Squat defects and Engine Burn defects • Apply special testing requirements for Wire feed repair welds in plain track • Report test results • Identify hazards associated with ultrasonic testing	• You CAN'T Perform ultrasonic testing on non rail applications (eg structural steel) • You CAN'T Use ultrasonic testing equipment on which you have not been assessed as competent • You CAN'T Perform dye penetrant or magnetic particle testing • You CAN'T Perform ultrasonic testing on turnouts and special trackwork • You CAN'T assess VSH Rail Defects • You CAN'T undertake Visual Assessment of Manganese & CV Crossings • You CAN'T Perform ultrasonic testing on flashbutt welds without specific training from the Technical Officer Rail Testing	• You also need TLIB2085 - Apply track fundamentals •

Table 7 - Track Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIS3011 - Test rail using non-destructive testing equipment	1. Perform Ultrasonic testing using hand held equipment on turnouts and special trackwork 2. Perform dye penetrant testing on plain rail and Turnouts and special trackwork 3. Perform magnetic particle testing on plain rail and Turnouts and special trackwork 4. Interpret, classify and report the results of ultrasonic, dye penetrant and magnetic particle tests 5. Undertake Assessment of VSH Rail Defects 6. Undertake Visual Assessment of Manganese & CV Crossings	• Understand Ultrasonic testing requirements for turnouts and special trackwork • Check turnouts for observable faults • Apply special inspection requirements for Alloy hardened crossings • Carry out Dye penetrant testing of switch blades • Carry out Magnetic particle testing • Apply special testing requirements for VSH defects and crossing nose laminations • Apply special testing requirements for Wire feed repair welds in crossings • Apply special testing requirements for rail closures • Report test results	• You CAN'T Perform ultrasonic testing on non rail applications (e.g. structural steel) • You CAN'T Use ultrasonic testing equipment on which you have not been assessed as competent	• You also need TLIB2085 - Apply track fundamentals • You also need TLIS3010 - Test rail using ultrasonic equipment
Level 3 Aluminothermic Weld Inspectors Certificate or equivalent	1. Coaching and mentoring of welding personnel 2. Provide advice on welding techniques and practices 3. Provide solutions for common welding issues 4. Perform workplace observations on aluminothermic welding activities	• Identify weld defect types • Identify welders responsibilities • Detailed understanding of weld inspection techniques and applicable inspection equipment • Document inspection results	• CAN'T train new welders in national competencies •	• Only applicable to Aluminothermic welding processes

Table 8 – Track Resurfacing Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIC2059 - Propel and operate light on-track equipment	1. Travel machines from stabling point to worksite 2. Operate light equipment on track, including: • spike pullers (ride on) • spike drivers • ballast scarifiers • multi-spindle borers • small sleeper spacers • dog screw setters/drivers • power track jacks • various fastening applicators • joint lifters • rail-mounted compressors • profile grinders	• Drive the equipment • Operate the equipment to perform its function • Safely stable the equipment • Understand requirements for track occupancy authority • Perform pre and post operational checks	• You CAN'T undertake Safeworking responsibilities	• You also need TLIB2085 - Apply track fundamentals
TLIW3027 - Operate minor track equipment	1. Place equipment on and off track 2. Operate equipment on track, including: • dog pullers • spike drivers • ballast scarifiers • multi-spindle borers • small sleeper spacers • dog screw setters/drivers • power track jacks • various fastening applicators • joint lifters • rail-mounted compressor	• Operate the equipment to perform its function • Safely move the equipment on and off track • Understand requirements for track occupancy authority • Perform pre and post operational checks	• You CAN'T undertake Safeworking responsibilities	• You also need TLIB2085 - Apply track fundamentals
TLIC2058 - Travel medium or heavy self-propelled on-track equipment	1. Travel machines from stabling point to worksite, including: • Tampers • Regulators • DTS	• Drive the equipment • Safely stable the equipment • Understand requirements for track occupancy authority • Perform pre and post operational checks	• You CAN'T undertake Safeworking responsibilities	• You also need TLIB2085 - Apply track fundamentals •
TLIW2032 - Identify the principles of tamping machine operations	1. Identify • components and work stations of tamping machines • basic functions of the tamping machine	• Understand basic track terminology • Ballast profile standards • Apply appropriate numeric functions when using a tamping machine	• You CAN'T operate a tamping machine without a licence for that machine	• You also need TLIB2085 - Apply track fundamentals

Table 8 – Track Resurfacing Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
	• hazards and risks associated with tamping machine operations	• Knowledge of risks to rail infrastructure from tamping		
TLIW2029 - Identify the principles of ballast regulator operations	1. Identify • components and work stations of regulators • basic functions of the regulators • hazards and risks associated with regulator operations	• Understand basic track terminology • Ballast profile standards • Functions of ballast • Apply appropriate numeric functions when using a regulator • Knowledge of risks to rail infrastructure from regulating ballast	• You CAN'T operate a regulator without a licence for that machine	• You also need TLIB2085 - Apply track fundamentals
TLIW2030 Identify the principles of dynamic track stabiliser operations	1. Identify • components and work stations of DTS • basic functions of the DTS • hazards and risks associated with DTS operations	• Understand basic track terminology • Ballast profile standards • Apply appropriate numeric functions when using a DTS • Knowledge of risks to rail infrastructure from DTS operations	• You CAN'T operate a DTS without a licence for that machine	• You also need TLIB2085 - Apply track fundamentals

Table 9 - Structures Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIB2086 - Apply awareness of structures fundamentals	1. Identify • types of bridges and structures • structures components • structures terminology and conventions • defect categories 2. Locate structures defects 3. Undertake roadside Inspection of Overbridges	• Understand Structures terms and conventions • Understand Fundamentals of structure types • Identify common structures components • Identify structures defects • Select equipment used for basic structures inspection		

Table 9 - Structures Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIS3029 - Implement structures maintenance and installation of minor structures	1. Plan maintenance and/or construction work 2. Implement maintenance and/or construction activities of a team at a worksite 3. Deal with maintenance and construction problems affecting structure integrity at the worksite	• Understand impact of defects on structure and track integrity • Identify and use appropriate range of structures repair and construction techniques • Select appropriate tools, equipment and competencies • Monitor work performance for technical and performance issues • Implement contingency plans for unexpected events during work activities • Complete relevant documentation		
TLIB2084 - Carry out routine maintenance of structures	1. Undertake routine maintenance on structures including • clearing debris • clearing vegetation • clearing drainage • cleaning weepholes	• Select and use required tools and equipment • Routine maintenance methods and techniques • Identify defects and remedies • Complete relevant documentation		
TLIB2083 - Maintain bridge bearings	1. Undertake maintenance and replacement of bridge bearings including • cleaning housings • clearing vegetation • tightening bolts • removing corrosion • resetting • oiling and/or greasing	• Functions of different types of bridge bearings • Routine maintenance methods and technique • Select and use relevant tools and equipment • Identify minor defects • Complete relevant documentation		
TLIS2036 - Use chemical repair products	1. Use epoxies and grouts for repair of structures and their components 2. Repair bearing pad	• Plan and organise work requirements • Identify scope of work • Clean and prepare components and surfaces • Mix chemical repair product • Apply chemical product • Clean excess repair product • Stabilise and support repair until cured • Complete relevant documentation		

Table 9 - Structures Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIB2096 - Repair concrete/masonry structures	1. Use epoxies and grouts for repair of structures and their components 2. Carry out the following concrete repairs on underbridges, overbridges, footbridges, culverts, tunnels, retaining walls, platforms, OHW structures, signal gantries (Sub-procedures) as detailed in the Structures Repair Manual: • Removing damaged concrete (except saw cutting) • Removing concrete at joints (except saw cutting) • Cleaning concrete substrate for patch repairs and re-casting • Cleaning concrete surface for overlays • Cleaning reinforcement ((using power tool cleaning) • Adding reinforcement • Applying bonding coat to concrete • Coating reinforcement • Formwork for re-casting concrete • Curing • Surface preparation for external coatings 3. Carry out the following concrete repairs as detailed in the Structures Repair Manual: • Grouting • Routing and sealing • Surface treatments • Flexible sealants for live cracks (except using crack cutter & concrete saw) • Patch repairs • Recasting with concrete • Replacing bearing pads • Repairs for corrosion • Protective coatings	• Identify defects in structures and their components • Determine work requirements and work methods • Select and use appropriate methods and equipment to repair or replace defective components • Mix and place chemical repair products • Clean and prepare structure/component surfaces • Remove and replace defective components • Use explosive power tools • Carry out functional checks after work has been completed • Identify defects affecting safe operation • Assess defects against defect limit standards and apply appropriate restrictions • Complete relevant documentation accurately	• You CAN'T use concrete saw • You CAN'T carry out the following concrete repairs: • Epoxy injection • Drilling and plugging • Stitching • Adding reinforcement to repair cracks • Sprayed concrete • You CAN'T carry out the following masonry repairs: • Miscellaneous repairs: damage by salt water and marine organisms	• To use concrete saw you need Certificate III in Carpentry, Concreting, Civil Construction or equivalent • To carry out the concrete repairs in the 'You CAN'T' column you need Certificate III in Carpentry, Concreting, Civil Construction or equivalent • To carry out the masonry repairs in the 'You CAN'T' column you need Certificate III in Bricklaying/ Blocklaying, Concreting, Civil Construction or equivalent

Table 9 - Structures Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIB2096 - Repair concrete/masonry structures *(cont'd)*	1. Carry out the following masonry repairs as detailed in the Structures Repair Manual: • Repairs of cracks • Fretting • Impact damage • Corrosion of embedded iron or steel • Miscellaneous repairs: minor displacement of masonry and damage by sulphate attack			
TLIB2082 - Repair steel structures	1. Use epoxies and grouts for repair of structures and their components 2. Carry out the following steel repairs on underbridges, overbridges, footbridges, culverts, tunnels, retaining walls, platforms, OHW structures, signal gantries (Sub-procedures) as detailed in the Structures Repair Manual: • Arresting corrosion • Removing rivets and replacing with bolts (except oxy-fuel cutting) • Patch painting (including surface preparation) • Filling voids (using power tool cleaning) • Sealing interfaces 3. Assist boilermaker with steel repairs	• Identify defects in structures and their components • Determine work requirements and work methods • Select and use appropriate methods and equipment to repair or replace defective components • Clean and prepare structure/component surfaces • Remove and replace defective components • Use explosive power tools • Carry out functional checks after work has been completed • Identify defects affecting safe operation • Assess defects against defect limit standards and apply appropriate restrictions • Complete relevant documentation accurately	• You CAN'T use oxy-fuel cutting equipment on steel structures • You CAN'T carry out the following steel repairs: • Repair corroded flanges and webs of I girders • Repair stiffeners, bracing connections and bearings • Repair fatigue damage • Repair impact damage • Repair stepways and footways structures • Replace members or elements of riveted members • You CAN'T weld steel structures	• To use oxy-fuel cutting equipment and to weld steel structures you need Certificate III in Engineering - Fabrication Trade • To carry out the steel repairs in the 'You CAN'T' column you need Certificate III in Engineering - Fabrication Trade

Table 9 - Structures Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIB2081 - Repair timber structures	1. Carry out timber repairs on underbridges, overbridges, footbridges, culverts, retaining walls, platforms: 2. Measure, prepare and cut replacement components 3. Treat timber surfaces 4. Tighten connections between components	• Identify defects in structures and their components • Determine work requirements and work methods • Select and use appropriate methods and equipment to repair or replace defective components • Clean and prepare structure/component surfaces • Remove and replace defective components • Carry out functional checks after work has been completed • Identify defects affecting safe operation • Assess defects against defect limit standards and apply appropriate restrictions • Complete relevant documentation accurately	• You CAN'T determine appropriate repair methods	
TLIW3034 - Apply protective coating systems to structures	1. Carry out patch paint repairs to steel structures	• Plan and prepare work • Select appropriate paint for the job • Prepare the surface using hand and power tools • Apply paint • Clean equipment	• You CAN'T do abrasive blast cleaning • You CAN'T paint large areas of steel structures	
TLIS2028 - Install and replace transoms	1. Remove and install bridge transoms manually or with mechanical handling / lifting equipment	• Plan and organise work requirements • Select and use equipment and tools • Remove and replace transoms safely • Fit transoms correctly, including thicknessing and notching of transoms • Install zinc strips and bolts correctly • Install transom packers correctly • Complete relevant records and documentation		

Table 9 - Structures Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIS2033- Install and repair temporary track supports	1. Install track baulks 2. Prepare, fabricate and install temporary support, including: • pig sties (max height 1.8m base to bottom of sleeper)	• Plan and organise work requirements • Prepare foundations • Identify and prepare components • Install temporary support using appropriate methods • Adjust Level and alignment of running surface • Adjust temporary support to ensure full bearing achieved • Complete appropriate documentation		
TLIS2013- Install minor structures	1. Install/remove: • ballast retention walls • ballast logs • intermediate rail support on ballast walls • level crossings • buffer stops • pipes and culverts • retaining walls • earthworks protection structures • cattle stops	• Identify functions of different types of minor structures • Plan and organise work requirements • Prepare foundations including excavation • Identify and prepare components • Install structure using appropriate methods • Check against specified requirements • Adjust structure as required • Complete appropriate documentation		• To install modular level crossings you also need training in the LX manufacturer's procedures for installation
TLIB3098 - Examine concrete/masonry structures	1. Undertake detailed examination of: • underbridges • overbridges • footbridges • tunnels • platforms • retaining walls • noise barriers • service crossings • buffer stops • track slabs 2. Undertake post irregularity examination of items in (1) above 3. Identify, measure, record and report defects 4. Assess condition	• Plan, prioritise and organise work requirements • Select and use appropriate structures examination equipment • Use measuring equipment • Identify different types of defects • Identify structurally critical members • Understand structure component deterioration rates under differing operating conditions • Establish seriousness of defects • Apply Defect Limits Standards to structure defects • Measure and record defects accurately • Take appropriate action for serious defects • Report examination results	• You CAN'T Undertake engineering assessment of defects and their impact on the rating of the structure	

Table 9 - Structures Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIB3088 - Examine steel structures	1. Undertake detailed examination of: • underbridges • overbridges • footbridges • Signal gantries • platforms • retaining walls • noise barriers • service crossings • buffer stops • lighting towers • water towers • turntables 2. Undertake post irregularity examination of items in (1) above 3. Identify, measure, record and report defects 4. Assess condition	• Plan, prioritise and organise work requirements • Select and use appropriate structures examination equipment • Use measuring equipment • Identify different types of defects • Identify structurally critical members • Understand structure component deterioration rates under differing operating conditions • Establish seriousness of defects • Apply Defect Limits Standards to structure defects • Measure and record defects accurately • Take appropriate action for serious defects • Report examination results	• You CAN'T Undertake engineering assessment of defects and their impact on the rating of the structure	• Additional competencies required for specialist testing: • Magnetic particle testing • Dye penetrant testing
TLIB3087 - Examine timber structures	1. Undertake detailed examination of: • underbridges • overbridges • footbridges • culverts • platforms • retaining walls • buffer stops / stop blocks • timber poles 2. Undertake post irregularity examination of items in (1) above 3. Identify, measure, record and report defects 4. Assess condition 5. Undertake detailed assessment of supported timber poles	• Plan, prioritise and organise work requirements • Select and use appropriate structures examination equipment • Use measuring equipment • Identify different types of defects • Identify structurally critical members • Understand structure component deterioration rates under differing operating conditions • Establish seriousness of defects • Apply Defect Limits Standards to structure defects • Measure and record defects accurately • Take appropriate action for serious defects • Report examination results	• You CAN'T Undertake engineering assessment of defects and their impact on the rating of the structure • You CAN'T undertake Detailed assessment of unsupported timber poles	

Table 9 - Structures Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
	6. Undertake Initial assessment of unsupported timber poles			
Structures Assessment (EA Level 3)	1. Assess defects 2. Certify structure safe for traffic after: • detailed structures examination • special examination of structures • repair work • installation of transoms • installation of minor structures • installation of temporary supports 3. Determine repair priorities 4. Determine appropriate repair methods 5. Undertake Detailed Assessment of unsupported timber poles	• Plan, prioritise and organise work requirements • Use appropriate measuring equipment • Identify different types of defects • Identify structurally critical members • Understand structure component deterioration rates under differing operating conditions • Assess the seriousness of defects • Apply Defect Limits Standards to structure defects • Take appropriate action for serious defects • Report assessment results • Allocate repair priorities in accordance with Defect Limits Standards • Select appropriate repair method in accordance with standard repair procedures	• You CAN'T determine the load rating of a structure • You CAN'T carry out fatigue assessment of a structure • You CAN'T design a repair method	• For certification of structures, you also need the competency relevant to the activity being certified.

Table 10 – Geotechnical Competency - Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIS3037 - Install and repair rail earthworks	1. Undertake trenching along or across track (less than 1.5 metre depth) 2. Clean, repair and construct rbble drains 3. Construct track formation and capping 4. Establish and maintain minor trackside Earthworks 5. Load spent ballast wagons	• Identifiy hazards and defects • Have basic mechanical knowledge relevant to routine rail earthworks • Understand drainage requirements of various types of earthworks • Understand causes of defects such as erosion and water scouring • Determine work requirements • Identify drainage systems • Select tools, equipment and materials. Plant may include front end loaders, back hoes, trench diggers, road trucks, hand tools and small plant • Select materials including soils and gravel, geo textile materials, lime and other stabilisation materials • Install drainage system and materials • Undertake grading and/or compaction • Use suitable materials and methods to establish track formation and capping • Construct suitable protection structures • Complete relevant documentation	• You CAN'T Reconstruct embankments or cuttings without an approved design • You CAN'T Undertake work on track formation without an approved design • You CAN'T Construct subsoil drainage and trenching without an approved design	• This competency covers minor works in maintenance and renewals. Major embankment and cutting renewal and construction is not covered.
TLIS2027 - Install and maintain surface track drainage	1. Clean, repair and construct surface drainage including: • Open Cess • Top • Side	• Identifiy hazards and defects • Have basic mechanical knowledge relevant to routine rail earthworks • Understand drainage requirements of various types of earthworks • Understand causes of defects such as erosion and water scouring • Determine work requirements • Identify drainage systems • Select tools, equipment and materials		

Table 11 – Right of Way Competency – Activity Matrix				
If you have	You CAN	You need to show you can	You CAN'T	Comments
TLIS2035 - Install and repair fences and gates	1. Install fence posts 2. Install fencing including • Stockproof • Urban • Manproof • Install gates • Repair fences and gates	• Understand fence construction materials and techniques • Plan and organise work requirements • Select and prepare suitable materials • Clear and excavate the site appropriately • Concrete and compact poles • String and tension fencing wire • Remove and replace defective components • Maintain workplace records		

Appendix 3 Engineering Authority

Table 12 –Engineering Authority Requirements – Track			
EA Level	Track Maintenance	Resurfacing	Track Renewals & Construction
CORE THESE ARE NATIONAL COMPETENCIES	**Track Maintenance Core (TMC)** • Apply track fundamentals • Carry out track ballasting • Install railway sleepers • Install and repair rail fastening systems • Carry out Rail Installation • Measure and record track geometry	**Resurfacing Core (RSC)** • Apply track fundamentals • Carry out track ballasting • Measure and record track geometry • Travel medium/heavy equipment	
1 Leading Hand THESE ARE NATIONAL COMPETENCIES	**All those from Track Maintenance Core +** • Check and repair track geometry • Implement track maintenance and construction • Check and repair points and crossings • Implement ballast unloading	**All those from Resurfacing Core +** • Check and repair track geometry • Implement track maintenance and construction • Measure and mark track for resurfacing • Implement ballast unloading • Principles of tamping • Principles of regulator operations • Principles of DTS	**All those from Track Maintenance Core +** • Check and repair track geometry • Implement track maintenance and construction • Implement ballast unloading
2 Leading Hand	**All those from Track Maintenance Level 1 +** • Track Examination Techniques • Establishing Track Work Priorities • Dealing with Track irregularities • Welding Specialist	**All those from Resurfacing Level 1 +** • Establishing Track Work Priorities	**All those from Track Renewals & Construction Level 1 +** • Establishing Track Work Priorities • Welding Specialist
3 Superintendent / Maintenance Engineer / Project Engineer	• Advanced Track Fundamentals • Certifying Track after Work • Manage Track Maintenance & Construction • Manage Track and Rail Examination • Manage Track Condition • Investigating and Managing Track Irregularities • Technical supervision of rail grinding	• Advanced Track Fundamentals • Manage Track Maintenance & Construction	• Advanced Track Fundamentals • Manage Track Maintenance & Construction • Technical supervision of rail grinding
4 CME	**All those from Track Maintenance Level 3 +** • Advanced Civil Infrastructure Condition Management		

Table 12 –Engineering Authority Requirements – Track		
	• Manage other works • Elementary Track Design	
4 CRN Rail Engineer	**All those from Track Maintenance Level 3 +** • Advanced Civil Infrastructure Condition Management • Manage other works • Elementary Track Design • CRN Rail Engineer	

Table 13 –Engineering Authority Requirements - Structures		
EA Level	Maintenance	Construction
CORE THESE ARE NATIONAL COMPETENCIES	**Structures Maintenance Core** • Apply awareness of structures fundamentals • Carry out routine maintenance of structures	
1 Leading Hand THESE ARE NATIONAL COMPETENCIES	**All those from Structures Maintenance Core +** • Install minor structures • Implement structures maintenance and installation of minor structures • Repair concrete/masonry structures • Repair steel structures • Repair timber structures • Apply protective coating systems to structures • Maintain bridge bearings • Install and replace transoms	**All those from Structures Maintenance Core +** • Install minor structures • Implement structures maintenance and installation of minor structures • Repair concrete/masonry structures • Repair steel structures • Repair timber structures • Apply protective coating systems to structures • Install and replace transoms
2 Leading Hand	**All those from Structures Maintenance Level 1 +** • Dealing with Structures irregularities • Establishing Structures Work Priorities	**All those from Structures Maintenance Level 1 +** • Establishing Structures Work Priorities
3 Superintendent / Maintenance Engineer / Project Engineer	• Advanced Structures Fundamentals • Certifying Structures after Work • Manage Structures Maintenance & Construction • Manage Structures Examination • Manage Structures Condition • Investigating and Managing Structures Irregularities	• Advanced Structures Fundamentals • Certifying Structures after Work • Manage Structures Maintenance & Construction
4 CME	**All those from Structures Maintenance Level 3 +** • Advanced Civil Infrastructure Condition Management • Manage other works	
4 CRN Structures Engineer	**All those from Structures Maintenance Level 3 +** • Advanced Civil Infrastructure Condition Management • Manage other works • CRN Structures Engineer	

Table 14 –Engineering Authority Requirements - Facilities		
EA Level	Maintenance	Construction
CORE THESE ARE NATIONAL COMPETENCIES		
1 Leading Hand THESE ARE NATIONAL COMPETENCIES		
2 Leading Hand	• Establish Facilities Work Priorities • Facilities Visual Inspection	
3 Superintendent	**Leading Hand Level 2 +** • Advanced Facilities Fundamentals	
4 CME		

Appendix 4 Knowledge and skill requirements for EA levels 2 to 4

Table 15 - Knowledge and skill requirements for EA levels 2 to 4
Track Maintenance, Renewals and Construction

If you have	You CAN	You need to show you can	You CAN'T	Comments
Level 2				
Track Examination Techniques	1. Provide technical direction to track examination personnel 2. Undertake relevant technical management activities detailed in CRN CM 203 3. Review track examination activities 4. Manage identified defects	• interpret TMP Work Orders • understand the requirements of track patrol and track examination to meet TMP requirements • Demonstrate detailed understanding of the requirements for track examination (CRN CM 203) • Demonstrate an understanding of the track examination techniques used in CRN • Demonstrate an understanding of how inspections should be conducted • Identify the types of changes and defects that are typically found • Demonstrate appropriate response to changes and defects • Demonstrate an understanding of the recording, assessment and reporting requirements	• Undertake Track Examination or Track Patrol without appropriate competencies • Persons conducting Track Patrol must have "TLIB3100 - Visually inspect track infrastructure • Persons conducting Track Examination must have "Track Examination" competencies	• This is not the competency for doing the work, but is an essential component of the supervisory skill set
Establishing Track Work Priorities	1. Make competent judgements on the order of work 2. Assess impact of delays to high priority work 3. Establish alternative or interim repair work to adjust priorities	• Set work priorities based on • condition, • risk of deterioration, • delay required to organise, • ability to get access, • ability to get right team together etc.		

Table 15 - Knowledge and skill requirements for EA levels 2 to 4 Track Maintenance, Renewals and Construction				
If you have	You CAN	You need to show you can	You CAN'T	Comments
Dealing with Track irregularities	1. Inspect track after reported irregularities for damage to civil infrastructure 2. Determine when measurements are required 3. Assess whether trains can run and if operating restrictions are required 4. Provide accurate reports to management of incident details and damage 5. Determine when expert assistance is required	• inspect track and structures infrastructure for damage • assess safety of continued train operation • protect infrastructure from further damage and prevent train safety incidents • provide appropriate reports to management • determine when to call in higher level or other expertise	• Investigate derailments • To certify track after irregularities you need Check and repair track geometry • Leading Hand may deal with minor irregularities (rough track, obstruction etc.) but would only be first at scene for major accidents	• Infrastructure workers who already have Patrol Track, Examine Track and Check and repair track geometry meet the requirements for elements a, b and c
Technical supervision of rail grinding	1. Establish and monitor rail grinding operations 2. Determine locations of track obstructing rail grinding operations	• Demonstrate how to identify the correct rail profile and gauge for use within the CRN • Demonstrate the ability to measure rail profile for conformance to the rail profile gauges • Demonstrated identification of track obstructions for grinding operations	• Undertake activities beyond the authorities detailed in CRN CM 225	

Level 3				
Advanced Track Fundamentals	1. Determine the requirement for and review Engineering/District Waiver	• Identify types of track and rail defects, the ways in which track components fail and deterioration rates. Influence of traffic, environment etc. on deterioration rates • Demonstrate understanding of operational and performance requirements of civil infrastructure assets • Demonstrate knowledge of the engineering standards related to track and right of way • Demonstrate understanding of the basics of advanced track maintenance techniques (e.g. rail grinding) • Demonstrate understanding of the life cycle of track assets under varying operating conditions		• There are no defined activities associated with this competency. It provides essential background knowledge for other necessary competencies
Certifying Track after Work	1. Inspect track after maintenance or construction work has been undertaken 2. Select appropriate measurement types and techniques 3. Undertake measurements of key parameters 4. Assess compliance of work to acceptance standards 5. Assess the need for and impose operating restrictions for non-compliance 6. Certify the track for operation	• Demonstrate detailed understanding of what to look for when checking condition • What is affected by different work activities • What measurements to take when assessing fitness • Hidden problems • Demonstrate detailed knowledge of acceptance standards for activities • Geometry • Stability • Earthworks • Clearances • Configuration • Condition and placement • Interpret and apply Base Operating Standards • Interpreting BOS • How to apply BOS • Applying Speed Restrictions	• Certify track or turnouts where the track geometry have been altered	• It is intended that this competency be available for Superintendent and CME to allow them to certify track and turnouts without the requirement to complete the full Check and Repair Track Geometry and Check and Repair Points & Crossings competencies (this would require them to lift and line track and repair turnouts)

Investigating and Managing Track Irregularities	1. Investigate the cause of track irregularities 2. Take appropriate action to protect damaged track 3. Investigate Low level mainline derailments where track IS involved in cause or moderate level mainline derailments where track IS NOT involved in cause 4. Provide accurate reports to management of incident details and damage 5. Determine when expert assistance is required	• investigate track incidents and emergencies • manage track incidents and emergencies • investigate derailments • manage derailment sites • undertake Derailment Cause analysis • demonstrate use of specialised measuring equipment		• This is a level above "Dealing with Track irregularities" • It includes training in the Derailment Investigation Manual (CRN CM 213)
Manage Track and Rail Examination	1. Interpret and apply TMP requirements to implement appropriate inspections 2. Manage track examinations • Track patrol • Scheduled track examination • Turnout examinations • Right of Way Examination • Clearances • Level Crossings • Field requirements for track recording examination 3. Manage rail examinations • Field requirements for hi-rail examination • Manual ultrasonic testing • Manual testing of turnouts 4. Manage WTSA measurement and analysis and non-welded track assessment 5. Assess level crossing protection	• Demonstrate detailed understanding of track and rail examination techniques in CRN • Demonstrate detailed understanding of management requirements for track examination (CRN CM 203) and rail examination (CRN CM 224) • Superintendent and CME role in examinations • Risk Assessment of varying inspection frequencies (CME) • Limitations of authority to vary TMP(CME) • Demonstrate detailed understanding of requirements for special inspections and special inspection regimes (CRN CM 203 and CRN CM 224) • Undertake assessment of level crossing protection and sighting distances (CRN CM 521)	• Undertake activities beyond the authorities detailed in CRN CM 203 and CRN CM 224	

Manage Track Condition	1. Assess infrastructure condition from available information 2. Develop actions to improve condition, safety and reliability 3. Implement actions to improve condition, safety and reliability	• interpret Track Patrol and Examination reports • interpret Track Recording, Rail Defect and other condition reports • Use risk analysis techniques to assess risk to continued operation of various defects • Geometry • Rail Condition • Track components • Turnouts • Track Stability • Earthworks • determine appropriate risk mitigation actions • Speeds • Temporary Repairs • monitor condition, safety and reliability • Performance Indicators • Track condition Indices • Defect Removal Timeliness • Inspections		

Manage Track Maintenance & Construction	1. Develop work programs to repair/renew track and right of way • Work activities • Review maintenance and construction strategies to determine the best fit • Selection of repair/renewal methods • Resources – time, people, competencies, material, equipment, access 2. Undertake risk assessment of work programs • implications of delays in infrastructure replacement and alternative strategies to manage risk • risk of changes to works programs both in time and scope 3. Manage delivery of work programs to meet safety and quality requirements • How work is done • Acceptance of work • Correction of work going wrong 4. Develop alternative repair/renewal methods • minor component solutions • mixing of product types • partial change-out of turnout components • anchor pattern requirements • rail configuration (size, type, jointing) 5. Determine constructability of track designs 6. Determine requirements for permanent speeds (type and location) - applicability of local positioning factors 7. Determine operating requirements and restrictions during and post construction 8. Determine temporary track clearance infringements 9. Decide appropriate techniques for fire hazard reduction 10. Determine compliance of materials against design and/or CRN specifications	• Demonstrate detailed understanding of work activities • Approved method • Acceptance standards • competencies required • resources – material, equipment etc. • Demonstrate detailed understanding of operating and maintenance requirements and limitations of tools, equipment and small plant • Demonstrate knowledge of responsibilities for management of individual repair activities • Demonstrate detailed understanding of the impact of different work activities on operations and on each other • Select appropriate repair methods to match track condition, time, resources and track availability • Understand the impact of differing repair methods in differing situations (defect types, operating conditions, impact on interfaces, permanence of repairs etc.) • apply risk assessment techniques • Identify and evaluate improvements in work methods • Demonstrate understanding of requirements to interface with other disciplines (signals, structures, operations etc.) • Demonstrate detailed understanding of the requirements in CRN to manage • track stability • welding activities • Demonstrate knowledge of actions required to correct work activities that are going wrong (quality and time)		• "Manage" is a level above "Implement" • It includes prioritising, planning and responding to defects and emergencies. • It includes knowing the requirements of the maintenance or construction activity, the capabilities of the resources available, and making appropriate decisions to achieve a successful outcome • It also involves being able to correct activities that are going wrong

Level 4				
Manage other works	1. Manage other works that affect civil infrastructure • Undertrack Crossings • External party works in the rail corridor • External parties to use CRN poles to attach wires • Corridor excavations 2. Determine requirements for service crossings (CRN CM 541) 3. Determine potential of external party works to have implications on infrastructure integrity	• Demonstrate understanding of technical requirements for protection of infrastructure during and after work affecting track infrastructure • assess implication of work on future condition of infrastructure • demonstrate understanding of the effects of various trackside works, including external party works) on track infrastructure • Apply the requirements in CRN CM 541		

Advanced Civil Infrastructure Condition Management	1. Apply appropriate management strategies to deal with specific infrastructure conditions 2. Undertake risk assessment of work programs 3. Assess infrastructure condition, safety and reliability from available information 4. Develop actions to improve condition, safety and reliability 5. Issue Hot work authorities in Total fire Bans 6. Develop strategies for mixing timber and steel sleepers 7. Determine the following requirements for track, structures and geotech/drainage designs • constructability and maintainability • impact of operational changes on inspection and maintenance requirements • work quality at "Hold points" during construction • construction staging requirements to ensure integrity of infrastructure • impact of other infrastructure changes before and during work • potential of other rail works) to have implications on track integrity 8. Determine the following requirements for track • application of standard track configurations • applicability of alternative replacement in emergencies. • need for special fastening arrangements (noise, vibration, track stiffness modulation etc) • guard rail system • rail grinding strategies • lubrication strategies • strategy for cascading rail • impact of track defects and changes on integrity of other infrastructure and external parties	• Demonstrate detailed understanding of management of rail defect testing and repairs (CRN CM 224) • rail defect testing • protection and repair of rail defects • testing non-standard or untestable rail • assessment of rail condition for special or increased testing requirements • Demonstrate detailed understanding of rail condition management (CRN CM 224, CRN CM 225) • rail grinding strategies and techniques • Rail Lubrication strategies • Rail surface condition • Demonstrate detailed understanding of management of Welded Track Stability and Adjustment Control (CRN CM 211) • work in hot weather • misalignments • Demonstrate detailed understanding of management of Geotechnical Risks (CRN CM 401) • Demonstrate detailed understanding of management of Bushfire and Hot Weather Hazards (CRN CM 501) • bushfire hazards • work in hot weather • issue of Hot Work Authorities • Demonstrate detailed understanding of management of structures condition (CRN CM 301) • Demonstrate understanding of management of non-operational lines • Demonstrate detailed understanding of management of sleeper condition and replacement (CRN CM 231)		• This the key CME competency

Advanced Civil Infrastructure Condition Management (continued)	9. Determine the following requirements for right of way • right of way lease conditions • vegetation management strategy (fire hazard reduction and weed control) • access road location • application of fencing policy to specific locations • fencing repair/replacement requirements 10. Determine the following requirements for level crossings • unsatisfactory level crossing signs • risk assessment for non-compliant crossings • risk assessment for service crossings • level of protection • level crossing material construction 11. Determine the following requirements for earthworks • EWS, rock fall protection, scour protection, flood protection, slip protection etc. • heavy loads on earthworks and formation • placement of fill and excavation works • embankment widening • foundation bearing capacity for track formation, minor structures, run-on slabs etc. • field variations to design on a temporary basis • minor designs (eg drainage and earthworks, batter slopes • excavations in the vicinity of structure footings • approval of fill material (including testing) • de-vegetation of cuttings 12. Determine the following requirements for structures • suitability of standard designs for minor works • emergency repair designs	(see previous page)		

	• site specific application of standard structure designs for concrete pipes and culverts • guardrail clearances on bridges • track off-sets from structure span centre-line 13. Determine the following requirements for drainage • review of track drainage • minor drainage designs for a temporary solution to a local problem • review of waterways • variations to design due to unanticipated conditions • column/pier strike protection • anti-throw barriers on overbridges/footbridges • guard rails on ballast top underbridges			

Elementary Track Design	1. Approve variation to design limits within limits of authority (CRN CS 210, CRN CM 211) • geometry beyond normal limits up to, but not exceeding the minimum/maximum design limits • variation to standard vertical curve length • minor field variations to design (on a temporary basis. 2. Apply appropriate techniques to analyse clearances and clearance infringements (CRN CS 215, CRN CM 215) • temporary structure clearance infringements • reduced service clearances in structure design • requirements for restrictions on track movements (horizontal and vertical restrictions) 3. Determine requirements for yard speeds (type and location) • Determine type and location of turnouts, diamonds, slips etc • Determine type and location of expansion switches • Determine safe throw-off locations for catch points • Determine position of tracks in yards • Determine if there are implications of changes to ballast depth on track and structures integrity	• Demonstrate understanding of the principles of track alignment design — Curve geometry — Transitions — Superelevation — Speed/curvature relationship — Design limits • Demonstrate understanding of the principles of special trackwork design — Turnout geometry — Speed/curvature relationship — Impact forces in turnouts • Demonstrate understanding of the principles of track structure and track component design — Wheel/Rail forces — Track Structure models — Factors considered in track structure and component design • Demonstrate understanding of transit space design and assessment — Transit Space model (Rollingstock + Kinematics + Clearance) — Calculating Transit Space requirements	• Undertake track design	• This is about giving field engineers a grounding in design basics so that they can apply basic understanding as part of maintenance management.

CRN Rail Engineer	1. Determine appropriate defect removal method in accordance with CRN CM 225 2. Approve deviation from standard rail profile templates for the purposes of minimising metal removal (ie transitional profile) or minimise contact stresses (ie field or gauge side relief) 3. Establish the requirements for removal and replacement of track obstructions for the purposes of rail grinding activities 4. Determine the appropriate metal removal requirements for preventative and maintenance grinding 5. Carry out rail condition monitoring in accordance with CRN CM 225 6. Investigate areas of incorrect wheel/rail contact 7. Determine Lubrication Strategies for track 8. Determine effectiveness of lubrication strategy 9. Determine variation from rail crossing longitudinal profile to minimise wear 10. Assess track infrastructure for increasing axle loads and line speeds 11. Undertake the following activities related to approval of track products; 12. Assessment of compliance to Standards / Performance 13. Assessment of new material & technology 14. Inspection of fabrication / manufacture 15. Recommend Type Approval	• Demonstrated detailed understanding of • Limitations of rail grinding • Rail profiling practices • Demonstrated ability for accurately recording the rail profile and compare to design rail profiles • Demonstrated knowledge of wheel/rail interaction in the areas of • Plain track • Crossings • Demonstrated knowledge of lubrication limitations and effectiveness • Apply hazard identification and analysis techniques • Demonstrate detailed knowledge of and successful application of investigation and analysis techniques related to track products • Identify interfaces between track and other infrastructure	• Undertake activities beyond the authorities detailed in CRN CM 225 • Undertake design	• "Manage" is a level above "Implement" • It includes prioritising, planning and responding to defects and emergencies. • It includes knowing the requirements of the maintenance or construction activity, the capabilities of the resources available, and making appropriate decisions to achieve a successful outcome • It also involves being able to correct activities that are going wrong

Table 16 - Knowledge and skill requirements for EA levels 2 to 4 Structures Maintenance and Construction				
If you have	You CAN	You need to show you can	**You CAN'T**	**Comments**
Level 2				
Establishing Structures Work Priorities	1. Make competent judgements on the order of work 2. Assess impact of delays to high priority work 3. Establish alternative or interim repair work to adjust priorities	• Set work priorities based on — condition, — risk of deterioration, — delay required to organise, — ability to get access, — ability to get right team together etc.		
Dealing with Structures irregularities	1. Inspect structures after reported irregularities for damage to civil infrastructure 2. Determine when measurements are required 3. Assess whether trains can run and if operating restrictions are required 4. Provide accurate reports to management of incident details and damage 5. Determine when expert assistance is required	• inspect structures infrastructure for damage • assess safety of continued train operation • protect infrastructure from further damage and prevent train safety incidents • provide appropriate reports to management • determine when to call in higher level or other expertise	• Investigate derailments • To certify structures after irregularities, structures assessment review is required • Leading Hand may deal with minor irregularities (bridge strikes, obstruction etc.) but would only be first at scene for major accidents	• Infrastructure workers who already have Structures Examination competencies meet the requirements for elements a, b and c

Level 3				
Advanced Structures Fundamentals	1. Determine the requirement for and review Engineering/District Waiver	• Identify types of structures defects, the ways in which structures components fail and deterioration rates. Influence of traffic, environment etc. on deterioration rates • Identify types of earthworks defects, the ways in which earthworks fail and deterioration rates. Influence of traffic, environment etc. on deterioration rates • Demonstrate understanding of operational and performance requirements of structures and earthworks assets • Demonstrate knowledge of the engineering standards relating to structures and earthworks configuration • Understand the basics of advanced structures and earthworks maintenance techniques • Demonstrate understanding of the life cycle of structures and earthworks assets under varying operating conditions		• There are no defined activities associated with this competency. It provides essential background knowledge for other necessary competencies
Manage Structures Examination	1. Interpret and apply TMP requirements to implement appropriate inspections 2. Manage track examinations 3. undertake visual examination of structures to meet TMP requirements	• Demonstrate detailed understanding of structures examination techniques in CRN • Demonstrate detailed understanding of management requirements for structures examination (CRN CM 302) — Superintendent and CME role in examinations — Risk Assessment of varying inspection frequencies (CME) — Limitations of authority to vary TMP(CME)	• Undertake activities beyond the authorities detailed in CRN CM 302	

Certifying Structures after Work	1. Inspect structures after maintenance or construction work has been undertaken in compliance to standards and/or approved design 2. Select appropriate measurement types and techniques 3. Undertake measurements of key parameters 4. Assess compliance of work to acceptance standards 5. Assess the need for and impose operating restrictions for non-compliance 6. Certify the structures for operation	• Demonstrate detailed understanding of what to look for when checking condition — What is affected by different work activities — What measurements to take when assessing fitness — Hidden problems • Demonstrate detailed knowledge of acceptance standards for activities — repair work — installation of transoms — installation of minor structures — installation of temporary supports • Interpret and apply Base Operating Standards • Interpreting BOS • How to apply BOS • Applying Speed and load Restrictions	• You CAN'T determine the load rating of a structure • You CAN'T carry out fatigue assessment of a structure • You CAN'T design a repair method	[Grab your reader's attention w the document or use this spac point. To place this text box ar drag it.] • It is intended that this competency be available for Superintendents, Project Engineers and CME to allow them to certify structures without the requirement to have individual installation and repair competencies

Manage Structures Maintenance & Construction	1. Develop work programs to repair/renew track and right of way • Work activities • Review maintenance and construction strategies to determine the best fit • Selection of repair/renewal methods • Resources – time, people, competencies, material, equipment, access 2. Undertake risk assessment of work programs • implications of delays in infrastructure replacement and alternative strategies to manage risk • risk of changes to works programs both in time and scope 3. Manage delivery of work programs to meet safety and quality requirements • How work is done • Acceptance of work • Correction of work going wrong 4. Develop alternative repair/renewal methods • minor repair designs for non-critical components • applicability of alternative replacement 5. Determine constructability of structures designs 6. Determine operating requirements and restrictions during and post construction 7. Determine compliance of materials against design and/or CRN specifications	• Demonstrate detailed understanding of work activities — Approved method — Acceptance standards — competencies required — resources – material, equipment etc. • Demonstrate detailed understanding of operating and maintenance requirements and limitations of tools, equipment and small plant • Demonstrate knowledge of responsibilities for management of individual repair activities • Demonstrate detailed understanding of the impact of different work activities on operations and on each other • Select appropriate repair methods to match structure condition, time, resources and track availability • Understand the impact of differing repair methods in differing situations (defect types, operating conditions, impact on interfaces, permanence of repairs etc.) • apply risk assessment techniques • Identify and evaluate improvements in work methods • Demonstrate understanding of requirements to interface with other disciplines (signals, track, operations etc.) • Demonstrate knowledge of actions required to correct work activities that are going wrong (quality and time)		• "Manage" is a level above "Implement" • It includes prioritising, planning and responding to defects and emergencies. • It includes knowing the requirements of the maintenance or construction activity, the capabilities of the resources available, and making appropriate decisions to achieve a successful outcome • It also involves being able to correct activities that are going wrong

Manage Structures Condition	1. Assess infrastructure condition from available information 2. Develop actions to improve condition, safety and reliability 3. Implement actions to improve condition, safety and reliability	• interpret Structures Examination reports • Use risk analysis techniques to assess risk to continued operation of various defects • determine appropriate risk mitigation actions — Speeds — Temporary Repairs • monitor condition, safety and reliability — Performance Indicators — Track condition Indices — Defect Removal Timeliness — Inspections		
Investigating and Managing Structures Irregularities	1. Investigate the cause of structures irregularities 2. Take appropriate action to protect damaged structures 3. Provide accurate reports to management of incident details and damage 4. Determine when expert assistance is required	• investigate structures incidents and emergencies • manage structures incidents and emergencies		
CRN Structures Engineer	1. Undertake minor civil and structures design 2. Undertake assessments for OSOM applications	• Demonstrate detailed knowledge of AS 5100 and CRN bridge design requirements • Demonstrate knowledge of CRN standards for design documentation • Apply hazard identification and analysis techniques		

Table 17 - Knowledge and skill requirements for EA levels 2 to 4 Facilities Management				
If you have	**You CAN**	**You need to show you can**	**You CAN'T**	**Comments**
Level 2				
Establishing Facilities Work Priorities	1. Make competent judgements on the order of work 2. Assess impact of delays to high priority work 3. Establish alternative or interim repair work to adjust priorities	• Set work priorities based on — condition, — risk of deterioration, — delay required to organise, — ability to get access, — ability to get right team together etc.		
Facilities Visual Inspections	1. Undertake visual inspection of facilities assets 2. Undertake post irregularity inspections of facilities assets 3. Identify, measure, record and report of defects suitable for engagement of expert assistance 4. Determine when expert assistance is required	• Plan, prioritise and organise work requirements • Select and use appropriate examination equipment • Use appropriate measuring equipment • Identify different types of defects • Establish seriousness of defects • Measure and record defects accurately • Take appropriate action for serious defects • Report examination results	• Assess facilities for adequacy of Structural, Electrical, Fire, Hydraulic or Mechanical Systems	

Table 17 - Knowledge and skill requirements for EA levels 2 to 4 Facilities Management				
If you have	**You CAN**	**You need to show you can**	**You CAN'T**	**Comments**
Level 3				
Advanced Facilities Fundamentals	1. Assign EA Level 2 to required personnel 2. Interpret and apply TMP requirements to implement appropriate inspections 3. Manage Facilities examinations	• Demonstrate detailed understanding of work activities — Approved method — Acceptance standards — competencies required — resources – material, equipment etc. • Demonstrate detailed understanding of operating and maintenance requirements and limitations of tools, equipment and small plant • Demonstrate knowledge of responsibilities for management of individual repair activities • Demonstrate detailed understanding of the impact of different work activities on operations and on each other • Apply risk assessment techniques • Identify and evaluate improvements in work methods • Demonstrate understanding of requirements facilities management • Demonstrate knowledge of actions required to correct work activities that are going wrong (quality and time)		

Appendix 5 Knowledge and skill requirements for Engineering Authority for Design

Table 18 - Knowledge and skill requirements for Engineering Authority for Track Design

If you have	You CAN	You need to show you can	You CAN'T	Comments
Alignment design	1. Undertake the following design activities • Project scoping • Risks & Hazards Analysis • Site inspection, data search • Feasibility & Investigation Reports 2. Undertake Horizontal alignment design for • Plain track • Turnouts and special trackwork 3. Determine and resolve structures, signal, design interfaces 4. Undertake Vertical alignment design for • Plain track • Turnouts and special trackwork • Cross sections 5. Prepare and verify design documentation 6. Undertake independent verification of alignment design	a. Demonstrate detailed knowledge of CRN track alignment design requirements (CRN CS 210) b. Demonstrate detailed knowledge of CRN turnout design requirements (CRN CS 250) c. Demonstrate detailed knowledge of CRN track standards relevant to track design (CRN CS 200 to CRN CS 250) d. Demonstrate knowledge of CRN standards for design documentation e. Use industry standard software packages for track alignment design f. Demonstrate detailed knowledge of and successful application of industry standard track alignment design techniques g. Apply hazard identification and analysis techniques to track alignment design h. Identify interfaces between track and other infrastructure		
Permanent speed design	1. Undertake design of track speed, including • Assessment of speed profiles • Speed board analysis • Resolution of inter-discipline requirements (signals, braking etc.) 2. Prepare and verify Design documentation 3. Undertake independent verification of track speed design	a. Demonstrate detailed knowledge of CRN track alignment design requirements (CRN CS 210) b. Demonstrate detailed knowledge of CRN track speed requirements (CRN CS 210 and CRN CS 250) c. Apply the requirements of CRN standards to determine track speed d. Integrate other requirements into track speed design e. Apply hazard identification and analysis techniques to track speed design		

Table 18 - Knowledge and skill requirements for Engineering Authority for Track Design				
If you have	**You CAN**	**You need to show you can**	**You CAN'T**	**Comments**
Special trackwork design	1. Undertake the following design activities • General assembly of Turnouts, crossings, switches • bearer & plating design • Field layout 2. Prepare and verify Design documentation 3. Undertake independent verification of Special trackwork design	• Demonstrate detailed knowledge of CRN turnout design requirements (CRN CS 250) • Demonstrate detailed knowledge of CRN track standards relevant to turnout design (CRN CS 200 to CRN CS 250) • Demonstrate knowledge of CRN standards for design documentation • Demonstrate detailed knowledge of and successful application of industry standard techniques for turnout and special trackwork design • Apply hazard identification and analysis techniques to turnout and special trackwork design		
Transit space studies	1. Undertake detailed assessment of transit space, including assessment of Rail vehicle kinematics 2. Prepare and verify Design documentation 3. Undertake independent verification of transit space assessment	• Demonstrate detailed knowledge of CRN transit space design requirements (CRN CS 215) • Demonstrate knowledge of CRN standards for design documentation • Demonstrate detailed knowledge of and successful application of industry standard techniques for transit space investigation and design • Apply hazard identification and analysis techniques to transit space investigation and design		
Track structure design	1. Undertake investigation and design of track structure and components, including • Combination of sleeper type and spacing, ballast depth and formation strength • Fastening design • Sleeper design Excludes foundation design 2. Prepare and verify Design documentation 3. Undertake independent verification track structure design	• Demonstrate detailed knowledge of CRN track structure requirements (CRN CS 200 – CRN CS 240) • Demonstrate detailed knowledge of and successful application of industry standard techniques for track structure design • Apply hazard identification and analysis techniques to track structure design • Identify interfaces between track and other infrastructure		

Table 18 - Knowledge and skill requirements for Engineering Authority for Track Design				
If you have	**You CAN**	**You need to show you can**	**You CAN'T**	**Comments**
Product approval	1. Undertake the following activities related to approval of track products; • Assessment of compliance to Standards / Performance • Assessment of new material & technology • Inspection of fabrication / manufacture 2. Recommend Type Approval	• Demonstrate detailed knowledge of CRN product approval requirements (CRN CP 204) • Demonstrate detailed knowledge of and successful application of investigation and analysis techniques related to track products • Apply hazard identification and analysis techniques to track product design • Identify interfaces between track and other infrastructure		
Rollingstock interface	1. Undertake the following activities related to approval of track products; • Investigation and assessment of Track capacity for various rolling stock operations • Investigation and assessment of rail vehicle dynamics and the track interface 2. Prepare and verify report documentation	• Demonstrate detailed knowledge of CRN track structure requirements (CRN CS 200, CRN CS 210, CRN CS 215, CRN CS 220, CRN CS 230 and CRN CS 240) • Demonstrate detailed knowledge of and successful application of industry standard techniques for analysis of rolling stock dynamic forces and track response • Apply hazard identification and analysis techniques to analysis of rolling stock – track interfaces		

Table 19 - Knowledge and skill requirements for Engineering Authority for Structure Design				
If you have	You CAN	You need to show you can	You CAN'T	Comments
Bridge design	1. Undertake the following design activities • Project scoping • Risks & Hazards Analysis • Site Inspection, Data Search & Design Input • Feasibility & Investigation Report • Concept Design 2. Determine and resolve track, signal, design interfaces 3. Undertake structural design for • Concrete • Prestressed Concrete • Steel 4. Prepare and verify design documentation 5. Undertake independent verification of design 6. Undertake rating for Concrete, Steel & Timber bridges 7. Undertake Bridge Fatigue Assessment 8. Undertake Independent Certification of construction activities	• Demonstrate detailed knowledge of AS 5100 and CRN bridge design requirements (CRN CS 300, CRN CS 310 and CRN CS 320) • Demonstrate detailed knowledge of AS 5100 and CRN bridge load rating requirements (CRN CS 301 and CRN CS 302) • Demonstrate knowledge of CRN standards for design documentation • Use industry standard software packages for bridge and culvert design • Demonstrate detailed knowledge of and successful application of industry standard bridge design, load rating and fatigue assessment techniques in a rail environment • Apply hazard identification and analysis techniques to bridge design • Identify interfaces between structures and other infrastructure		
Foundation Design	1. Undertake foundation design for footings, piles and culverts 2. Undertake assessment of foundations	• Demonstrate detailed knowledge of AS 5100 and CRN structure design requirements (CRN CS 300, CRN CS 310 CRN CS 320and CRN CS 330) • Demonstrate knowledge of CRN standards for design documentation • Use industry standard software packages for foundation design • Demonstrate detailed knowledge of and successful application of industry standard techniques for foundation design in a rail environment • Apply hazard identification and analysis techniques to foundation design		

Table 19 - Knowledge and skill requirements for Engineering Authority for Structure Design				
If you have	You CAN	You need to show you can	You CAN'T	Comments
Structures Design	1. Undertake the following design activities • Project scoping • Risks & Hazards Analysis • Site Inspection, Data Search & Design Input • Feasibility & Investigation Report 2. Undertake structural design for • Signal gantries • Track slabs • Retaining walls • Buffer stops 3. Undertake independent verification of structure designs 4. Undertake Independent Certification of construction activities	• Demonstrate detailed knowledge of AS 5100 and CRN bridge design requirements (CRN CS 300 and CRN CS 330) • Demonstrate knowledge of CRN standards for design documentation • Use industry standard software packages for structures design • Demonstrate detailed knowledge of and successful application of industry standard structures design techniques in a rail environment • Apply hazard identification and analysis techniques to structures design • Identify interfaces between structures and other infrastructure		
Hydrology / Drainage Design	1. Undertake the following design activities • Project scoping • Risks & Hazards Analysis • Site Inspection, Data Search & Design Input • Feasibility & Investigation Report 2. Undertake design for : • Waterway requirements, • Flooding, flood plain management • Sub-surface drainage 3. Prepare and verify design documentation 4. Undertake independent verification of design 5. Undertake Independent Certification of construction activities	• Demonstrate detailed knowledge of Australian Rainfall and Runoff (ARR) guide • Demonstrate detailed knowledge of CRN drainage design requirements (CRN CS 420) • Demonstrate detailed knowledge of CRN waterway design requirements (CRN CS 310) • Demonstrate knowledge of CRN standards for design documentation • Use industry standard software packages for hydraulic design • Demonstrate detailed knowledge of and successful application of industry standard drainage and waterway design techniques in a rail environment • Apply hazard identification and analysis techniques to drainage and waterway design		

Table 19 - Knowledge and skill requirements for Engineering Authority for Structure Design				
If you have	You CAN	You need to show you can	You CAN'T	Comments
Civil Design	1. Undertake the following design activities • Project scoping • Risks & Hazards Analysis • Site Inspection, Data Search & Design Input • Feasibility & Investigation Report 2. Undertake civil design for • Level Crossings • Level crossing sighting distance determination • Traffic barrier requirements • Roads & pavements • Boundary fencing 3. Undertake Independent Certification of civil construction activities	• Demonstrated detailed knowledge of AS 1742.7 and CRN CS 520 • Demonstrated detailed knowledge of AS 1725, AS 2423 and CRN CS 510 • Demonstrated detailed knowledge of Austroads Guide to Road Design • Use industry standard software packages for civil design • Demonstrate detailed knowledge of a successful application of industry standard civil design techniques in a rail environment • Apply hazard identification and analysis techniques to civil design • Identify interfaces between civil and other infrastructure		

Table 20 - Knowledge and skill requirements for Engineering Authority for Geotechnical design				
If you have	You CAN	You need to show you can	You CAN'T	Comments
Geotechnical design and assessment	1. Undertake the following design activities • Earthworks • Structure foundations • Geotechnical problem remediation • Formation 2. Undertake inspection of geotechnical risk sites 3. Undertake review and risk assessment of geotechnical problem locations 4. Undertake geotechnical review of service crossings 5. Prepare and verify design documentation 6. Undertake independent verification of design 7. Supervision of geotechnical investigation and prepare geotechnical reports	• Demonstrate detailed knowledge of CRN earthworks, geotechnical and drainage requirements (CRN CS 410) • Demonstrate detailed knowledge of CRN geotechnical problem management requirements (CRN CM 401 and CRN CM 402) • Demonstrate knowledge of CRN standards for design documentation • Use industry standard software packages for earthworks and formation analysis and design • Demonstrate detailed knowledge of and successful application of industry standard earthworks, foundation and drainage design techniques in a rail environment • Demonstrate detailed knowledge of and successful application of geotechnical hazard identification and analysis techniques in a rail environment • Demonstrated knowledge of undertaking field investigations		

Table 21 - Knowledge and skill requirements for Engineering Authority for Survey				
If you have	You CAN	You need to show you can	You CAN'T	Comments
Railway Survey	1. Undertake the following survey activities and calculations: • Three Dimensional Control Surveys • Surveys of Track and other infrastructure including Turnouts, Platforms, Underbridges, Overbridges, Tunnels, Level Crossings, Culverts etc. • Precise Levelling Surveys • Surveys to mark and re-establish track control marks • Monitoring Surveys • Rail and Engineering Setout Surveys 2. Prepare and verify survey plans and documentation 3. Undertake searches for Underground Services using "Dial Before You Dig" or similar services. 4. Liaise with underground service locators to locate services. 5. Undertake searches for Survey Control through Survey Control Information Management System (SCIMS) 6. Establish rail kilometrage 7. Undertake boundary survey (Registered Surveyor only)	• Demonstrate detailed knowledge of CRN survey requirements (CRN CS 210, CRN CM 212, CRN CP 211 and CRN CP 212) • Demonstrate detailed knowledge of CRN track alignment design requirements (CRN CS 210) • Demonstrate detailed knowledge of CRN turnout design requirements (CRN CS 250) • Demonstrate detailed knowledge of CRN track standards relevant to track design (CRN CS 200 to CRN CS 250) • Demonstrate knowledge of CRN standards for survey documentation and plan presentation • Use industry standard software packages for survey calculations and plan preparation • Demonstrate detailed knowledge of and successful application of industry standard survey techniques in a rail environment • Apply hazard identification and analysis techniques to survey applications • demonstrate knowledge of instrument/equipment calibration as defined in the Survey and Spatial Information Regulation 2012 • Understand the Geocentric Datum of Australia (GDA) and how it relates to other datum used on NSW railways. • Understand the Australian Height Datum (AHD) and how it relates to other datum used on NSW railways. • Undertake surveys according to the Surveying and Spatial Information Act 2002 in regard to Public Authorities • Perform surveys to the required accuracy. • Interpret survey information to enable field surveys to relate to previous surveys. • Prepare reports on the manner in which the surveys were conducted and justification of results. • Identify the correct equipment to be used and the accuracy obtained by its use.	• You CAN'T undertake track alignment design unless you have been granted Engineering Authority for Track Alignment design • You CAN'T undertake any rail survey work that includes identifying the boundaries of land or affecting interests unless you are a Registered Surveyor.	• To undertake railway survey on the CRN you must have one of the following: 1. A Survey Party Leader with Associate level II qualifications or have qualifications to be accepted as an associate member of the Institution of Surveyors NSW 2. An approved Bachelor degree award in a discipline of surveying and have at least 4 years practical experience including at least 3 years in the railway industry and not require supervision for daily tasks. 3. A surveyor registered under the Surveying and Spatial Information Act 2002.

Appendix 6 UGLRL CRN Licence assessment requirements

Table 22 - UGLRL CRN Staff Licence Assessment Requirements(1)					
Competency		Licence period	Licence Assessment Requirements		
			Supervisors Report(2)	On-job Assessment	Civil Standards Briefing(3)
Track					
TLIB2085	Apply track fundamentals	Indefinite			
TLIS3039	Measure and mark track for resurfacing	3 years	Yes (3 years)		Yes (3 years)
TLIB2091	Measure and record track geometry	3 years	Yes (3 years)		Yes (3 years)
TLIS3026	Implement track maintenance and construction	3 years	Yes (3 years)		Yes (3 years)
TLIS2031	Install railway sleepers	3 years	Yes (3 years)		Yes (3 years)
TLIS2034	Install and repair rail fastening systems	3 years	Yes (3 years)		Yes (3 years)
TLIW3035	Heat and cut materials using oxy-LPG equipment for the rail industry	3 years	Yes (3 years)		Yes (3 years)
TLIS2044	Carry out rail installation	3 years	Yes (3 years)		Yes (3 years)
TLIB2121	Maintain rail joints	3 years	Yes (3 years)		Yes (3 years)
TLIB2097	Install and maintain guard rails	3 years	Yes (3 years)		Yes (3 years)
TLIS2012	Install and service rail lubrication equipment	3 years	Yes (3 years)		Yes (3 years)
TLIS2030	Carry out track ballasting	3 years	Yes (3 years)		Yes (3 years)
TLIS3025	Implement ballast unloading	3 years	Yes (3 years)		Yes (3 years)
TLIB3102	Adjust rail	3 years	Yes (3 years)	Yes (3 years)	Yes (3 years)
TLIW3015	Weld rail using aluminothermic welding process	1 year	Yes (1 year)	Yes (3 years)	Yes (3 years)
TLIW2012	Grind rails	3 years	Yes (3 years)		Yes (3 years)
TLIW0036	Apply electric welding process to rail	1 year	Yes (1 year)	Yes (3 years)	Yes (3 years)
TLIB3100	Visually inspect track infrastructure	3 years	Yes (3 years)	Yes (3 years)	Yes (3 years)
TLIB3099	Examine track infrastructure	3 years	Yes (3 years)	Yes (3 years)	Yes (3 years)
TLIB3094	Check and repair track geometry	3 years	Yes (3 years)	Yes (3 years)	Yes (3 years)

Table 22 - UGLRL CRN Staff Licence Assessment Requirements(1)					
Competency		Licence period	Licence Assessment Requirements		
			Supervisors Report(2)	On-job Assessment	Civil Standards Briefing(3)
TLIB3095	Check and repair points &crossings	3 years	Yes (3 years)	Yes (3 years)	Yes (3 years)
TLIW3013	Grind switches and crossings	3 years	Yes (3 years)		Yes (3 years)
TLIS3040	Construct concrete or steel points and crossings	3 years	Yes (3 years)		Yes (3 years)
TLIS3041	Construct timber or composite points and crossings	3 years	Yes (3 years)		Yes (3 years)
TLIS3045	Install turnouts	3 years	Yes (3 years)		Yes (3 years)
TLIS3010	Test rail using ultrasonic equipment	1 year	Yes (1 year)	Yes (3 years)	Yes (3 years)
TLIS3011	Test rail using non-destructive testing equipment	1 year	Yes (1 year)	Yes (3 years)	Yes (3 years)
Resurfacing					
TLIC2059	Propel and operate light on-track equipment	3 years	Yes (3 years)		Yes (3 years)
TLIW3027	Operate minor track equipment	3 years	Yes (3 years)		Yes (3 years)
TLIC2058	Travel medium or heavy self-propelled on-track equipment	3 years	Yes (3 years)		Yes (3 years)
TLIW2032	Identify the principles of tamping machine operations	3 years	Yes (3 years)		Yes (3 years)
TLIW2029	Identify the principles of ballast regulator operations	3 years	Yes (3 years)		Yes (3 years)
TLIW2030	Identify the principles of dynamic track stabiliser operations	3 years	Yes (3 years)		Yes (3 years)
Structures					
TLIB2086	Apply awareness of structures fundamentals	Indefinite			
TLIS3029	Implement structures maintenance and installation of minor structures	3 years	Yes (3 years)		Yes (3 years)
TLIB2084	Carry out routine maintenance of structures	3 years	Yes (3 years)		Yes (3 years)
TLIB2083	Maintain bridge bearings	3 years	Yes (3 years)		Yes (3 years)
TLIS2036	Use chemical repair products	3 years	Yes (3 years)		Yes (3 years)
TLIS2033	Install and repair temporary track supports	3 years	Yes (3 years)		Yes (3 years)
TLIB2096	Repair concrete/masonry structures	3 years	Yes (3 years)		Yes (3 years)

Table 22 - UGLRL CRN Staff Licence Assessment Requirements(1)					
Competency		Licence period	Licence Assessment Requirements		
			Supervisors Report(2)	On-job Assessment	Civil Standards Briefing(3)
TLIB2081	Repair timber structures	3 years	Yes (3 years)		Yes (3 years)
TLIB2082	Repair steel structures	3 years	Yes (3 years)		Yes (3 years)
TLIW3034	Apply protective coating systems to structures	3 years	Yes (3 years)		Yes (3 years)
TLIS2028	Install and replace transoms	3 years	Yes (3 years)		Yes (3 years)
TLIS2013	Install minor structures	3 years	Yes (3 years)		Yes (3 years)
TLIB3098	Examine concrete/masonry structures	3 years	Yes (3 years)	Yes (3 years)	Yes (3 years)
TLIB3088	Examine steel structures	3 years	Yes (3 years)	Yes (3 years)	Yes (3 years)
TLIB3087	Examine timber structures	3 years	Yes (3 years)	Yes (3 years)	Yes (3 years)
Geotechnical					
TLIS3037	Install and repair rail earthworks	3 years	Yes (3 years)		Yes (3 years)
TLIS2027	Install and maintain surface track drainage	3 years	Yes (3 years)		Yes (3 years)
Right of Way					
TLIS2035	Install and repair fences and gates	3 years	Yes (3 years)		Yes (3 years)

Note (1): Contractors are required to be licenced prior to commencing work on CRN civil infrastructure. To become licenced contractors shall have;

- the required competencies for the role, assessed and recertified at least at the frequencies listed in Appendix 6 Table 22 under ‘Licence Period’.
- a CRN Civil Standards Briefing at the frequency listed in Appendix 6 Table 22.
- a Supervisors Report or other equivalent process accepted by UGLRL CRN or evidence demonstrating competence as provided in Note (2) below.
- all licencing related records maintained within an online competency management system.

Note (2): Contractors must be able to demonstrate a candidates competency based on current evidence of satisfactory performance of the activities undertaken. Examples of demonstrated evidence may be in the form of but not limited to;

- a Supervisors Report completed by either the candidates supervisor or a UGLRL CRN supervisor where the candidate has been previously engaged.
- the contractor demonstrating a suitable alternative process within their management system
- the candidates current resume or CV
- a log book demonstrating performance of activities associated with the competency
- copies of inspection and test plans or records for activities associated with the competency
- past work history for UGLRL CRN

Note (3): UGLRL CRN employees required to have received the Civil Standards briefing, however, are not required to undertake 3 yearly briefing if they have had continuous service and briefed in all standards updates

UGLRL CRN supervisor's must assure themselves of contractor suitability at the time of tender or engagement. This is subject to the complexity of the work being undertaken and the level of UGLRL Supervision provided.

Appendix 7 UGLRL CRN Construction and Maintenance Engineering Authority Certificate

CERTIFICATE OF ENGINEERING AUTHORITY

Form EA1 *From CRN CM 001 – V 1.5 February , 2019* *Page 1 of 1*

This is to certify that
[Name]
Has been assessed and certified in the following activities

Expiry: / /

Track		Manage Track and Rail Examination		CRN Rail Engineer		Manage Structures Condition	
Track Examination Techniques		Manage Track Condition		Structures		Investigating and Managing Structures Irregularities	
Establishing Track Work Priorities		Investigating and Managing Track Irregularities		Dealing with Structures Irregularities		CRN Structures Engineer	
Dealing with Track irregularities		Advanced Civil Infrastructure Condition Management		Establishing Structures Work Priorities		Facilities	
Advanced Track Fundamentals		Manage other works		Advanced Structures Fundamentals		Establish Facilities Work Priorities	
Certifying Track after Work		Elementary Track Design		Certifying Structures after Work		Facilities Visual Inspection	
Manage Track Maintenance & Construction		Technical supervision of rail grinding		Manage Structures Maintenance & Construction		Advanced Facilities Fundamentals	
				Manage Structures Examination			

Conditions

Level 1 -	Certified as being able to perform the identified competency independently and without supervision in complex activities
Level 2 -	Certified as being able to perform the identified competency under varying degrees of supervision, dependant on complexity of activity
X -	Deemed not competent to undertake this activity
NA -	Not assessed

	Authorisation	Acceptance
Signature		
Name		
Position		
Date		

Appendix 8 UGLRL CRN Design Engineering Authority Certificate

CERTIFICATE OF DESIGN ENGINEERING AUTHORITY

Form EA2 *From CRN CM 001 – V 1.6 September , 2020* *Page 1 of 1*

This is to certify that
[Name]
Has been assessed and certified in the following activities

Expiry: / /

Track	
Alignment design	
Permanent speed design	
Special trackwork design	
Transit space studies	
Track structure design	

Product Approval	
Rollingstock interface	

Structures	
Bridge Design	
Foundation Design	
Structures Design	
Hydrology / Drainage Design	
Civil Design	

Geotechnical	
Geotechnical design and assessment	

Surveying	
Railway Survey	

Conditions

Level A -	Experienced designer who is capable to perform complex design activities independently and without supervision
Level B -	Designers who are competent to undertake the activity, however more complex configurations require supervision of a person with Category A in the design activity
X -	Deemed not competent to undertake this activity
NA -	Not assessed

	Authorisation	Acceptance
Signature		
Name		
Position		
Date		

Appendix 9 UGLRL CRN Construction and Maintenance Engineering Authority Self-assessment

Refer to CRN-FRM-CVL-713026361-313 - CRN Construction and Maintenance Engineering Authority Request (CM-001-Form EA3).docx

Note: Available on the UGLRL Intranet only

Appendix 10 UGLRL CRN Design Engineering Authority Self-assessment

CRN DESIGN ENGINEERING AUTHORITY REQUEST

Form EA4 *From CRN CM 001 – V 1.6 September, 2020* *Page 1 of 13*

Company:	*[Company Name]*	
	Applicant	**Applicant's Manager**
Name:	*[Name]*	*[Name]*
Position:	*[Position]*	*[Position]*
Signature:	*[Signature]*	*[Signature]*
Date:	*[dd/mm/yyyy]*	*[dd/mm/yyyy]*
Contact number:	*[Phone]*	*[Phone]*
Contact email:	*[email]*	*[email]*
Registered Engineer / Registered Surveyor:	*[Yes / No]*	**Registration number:** *(where applicable)* *[Number]*

This form is used by applicants requesting to be ...ed Design Engineering Authority in accordance w... the requirements of CRN CM 001 Civil Technical Competencies & Engineering Authority. The form should be used by following the below steps:

1. Identify the design activity/activities which are required/designated activity ...be ...rtaken located in the first column
2. The second column identifies the Engineering Authority 'competency' that is r...ired to ...take the required/designated activity
3. Idenfity the level of competency requested (A, B or Not requ...ed) in the third colu...
   A – Experienced designer who is capable to perform complex ...sign a... ...s indepe...dently and without supervision
   B – Designers who are competent to undertake the activity, how...er mo...c... ...configurations require supervision of a person with Category A in the design activity
   If not requested delete the applicable section of the table
4. The fourth coumn identifies the evidence that ...equired to be prov...d to be able to issue the design engineering authority
5. The fifth column is the evidence/ justification ...f your re...
   Evidence may be in the form of written exam... ...ng com...ted work, attached examples or evidence of training.
6. Upon completion send the completed request all required evid...ce and current CV to the Principal Track and Civil Engineer for review and acceptance as appropriate
   If insufficient evidence is provided, the Principal Trac... ...Eningeer may
   - *Apply conditions on the Engineering Authority gra...ed*
   - *Interview the applicant*
   - *Contact the applicant for referees to verify the evidence*
   - *Reject the application and provide the reasons for rejection so additional information can be supplied if relevant*

CRN DESIGN ENGINEERING AUTHORITY REQUEST

Form EA4 *From CRN CM 001 – V 1.6 September, 2020* *Page 2 of 13*

Track

If you want to	You need	Requested EA Level	You must provide satisfactory evidence of	Evidence
1. Undertake the following design activities for alignment design - Project scoping - Risks & Hazards Analysis - Site inspection, data search - Feasibility & Investigation Reports 2. Undertake Horizontal alignment design for - Plain track - Turnouts and special trackwork 3. Determine and resolve structures, signal, design interfaces 4. Undertake Vertical alignment design for - Plain track - Turnouts and special trackwork - Cross sections 5. Prepare and verify design documentation for alignment designs 6. Undertake independent verification of alignment design	**Alignment design**	[A, B or Not Req...]	a. Demonstrate detailed knowledge of CRN track alignment design requirements (CRN CS 210)	[Evidence if EA is requested for Alignment Design]
			b. Demonstrate detailed knowledge of CRN turnout design requirements (CRN CS 250)	[Evidence if EA is requested for Alignment Design]
			c. Demonstrate detailed knowledge of CRN track standards relevant to track design (CRN CS 200 to CRN CS 2...)	[Evidence if EA is requested for Alignment Design]
			d. Demonstrate knowledge of CRN standards for design documentation	[Evidence if EA is requested for Alignment Design]
			e. ... industry standard software packages for track alignment design	[Evidence if EA is requested for Alignment Design]
			f. Demonstrate detailed knowledge of and successful application of industry standard track alignment design techniques	[Evidence if EA is requested for Alignment Design]
			g. Apply hazard identification and analysis techniques to track alignment design	[Evidence if EA is requested for Alignment Design]
			h. Identify interfaces between track and other infrastructure	[Evidence if EA is requested for Alignment Design]